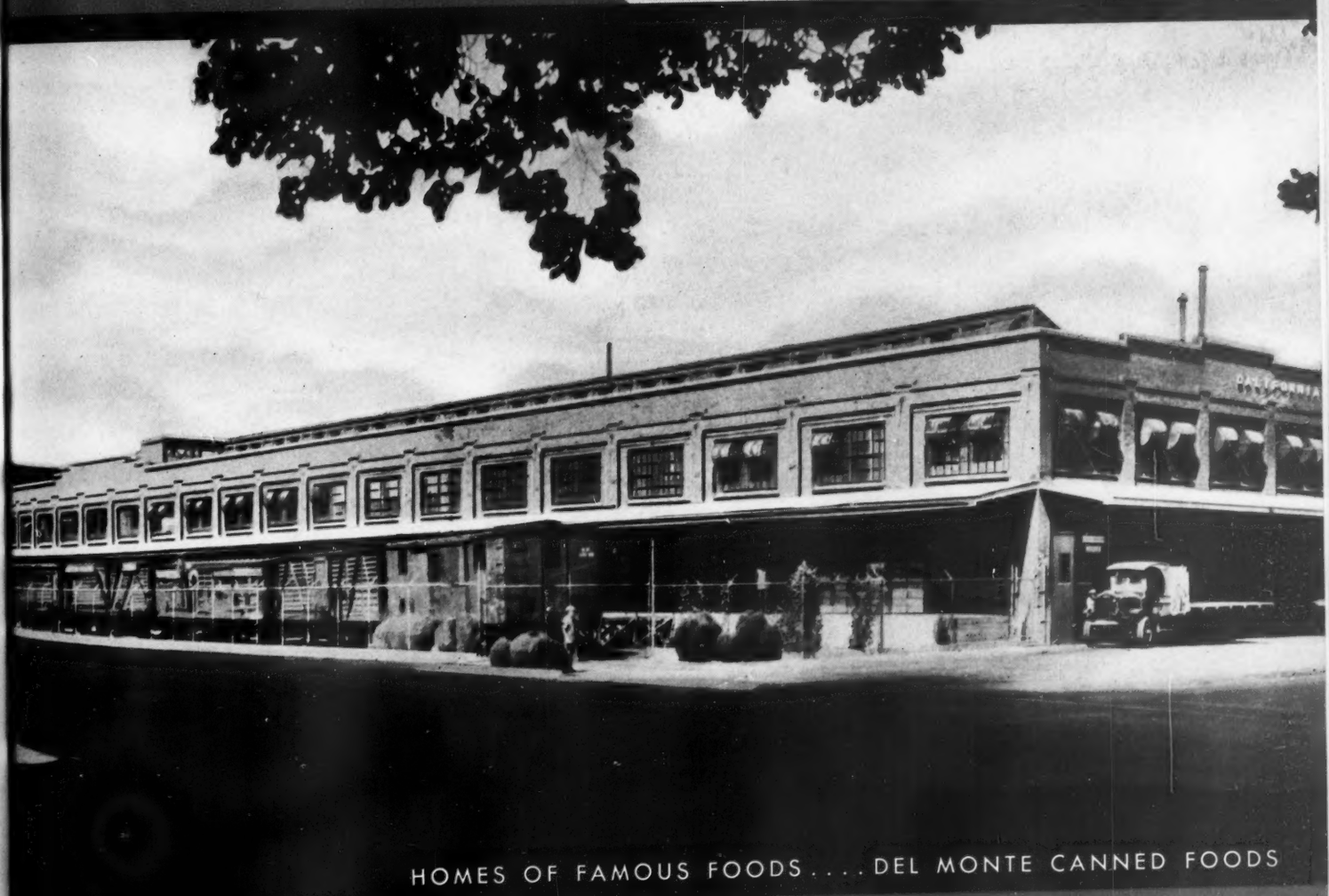
FOOD INDUSTRIES

AUGUST 1938



HOMES OF FAMOUS FOODS . . . . DEL MONTE CANNED FOODS

IN THIS ISSUE: Spices and Quality Control, Storage of Frozen Foods

McGRAW-HILL PUBLISHING COMPANY, INC.

Culminating a year of plant progress and expansion, Pfaudler, world's headquarters for Glass-Lined steel, announces the completion of an ALLOY DIVISION for the fabrication of alloy equipment and its specialized application in the processing industries.

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★ *Homes of Famous Foods*

Sacramento No. 11, one of a number of plants in which California Packing Corporation turns out its famous Del Monte brand of canned foods, is shown on the cover of FOOD INDUSTRIES this month.

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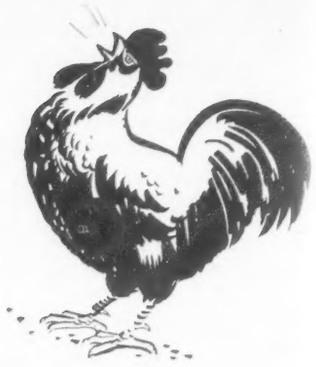
THEY CROW AS THEY GO . . .



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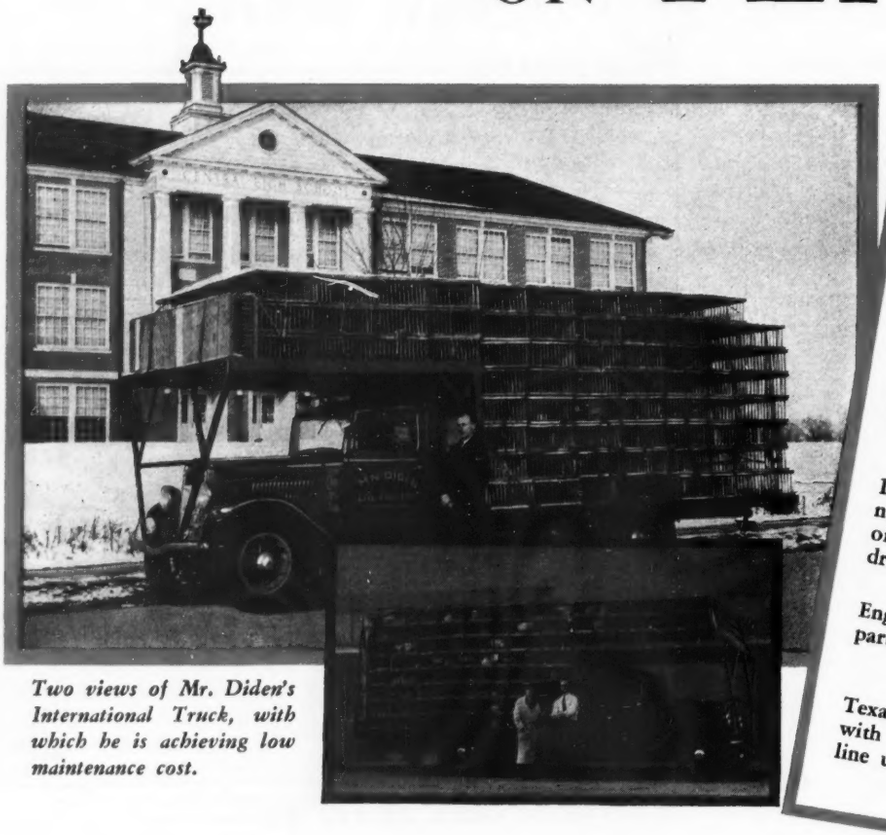

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FOOD INDUSTRIES

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Vol. 10, No. 8

Laurence V. Burton, Editor

•

AUGUST 1938

The Talk of the Industry

» "JIMMY'S GOT IT"—the recent yarn by Alva Johnston in the *Saturday Evening Post* has stirred up quite a bit of discussion, hereabouts. Jimmy, you remember, was one time president of National Grain Yeast Company. If the *S.E.P.* story is as much of an understatement as the one by the same author, about two years ago, regarding Jimmy's pa as a business man, one suspects that not more than 2 per cent of the story got into print.

» VANILLA is a delightful flavor of which most humanity is very fond, and there are also many who enjoy its near relative, coumarin. But it is

beyond all understanding how some women can entertain the notion that their personal attractiveness is enhanced by drenching themselves until they fairly reek with a perfume in which the predominant odor (not flavor) is vanillin or coumarin. Any ex-doughboy from the AEF can tell them why certain European femmes use perfume to excess.

» IF THE U.S. PATENT OFFICE issues a patent containing a word that is not to be found in the unabridged dictionary, that fact ought to be considered as the height of something or other. Its presence makes us wonder just how tough the patent examiners really are—their hard-boiled reputation notwithstanding.

The word which attracts our attention is "inconsubstantial" appearing in lines 47 and 53 of U.S. Patent No. 2,082,426 covering a process for preserving the natural properties of fruit, vegetable and similar juices, granted to Edwin Schoop, of Switzerland. It is used in the sense of adding an inconsubstantial acid, such as hydrochloric acid, to the fruit juice.

Even our appeal to the Patent Office reveals that the examiner is not quite sure what it means, but, he assures us, the inventor insisted that no other word would do. Fancy a European coming over to improve our language!

» THE FAVORITE INDOOR SPORT of the big shots of industry in June and July has been to indulge in frantic and often unwarranted speculation on the probable results of the anti-monopoly investigations.

Admittedly there are a few concerns whose past public relations policies have been just plain lousy, and these will probably get a vigorous workout. Indeed, it is said that there are such companies, now beset on every side by chiselers, who dare not put up a strong commercial defense lest the anti-monopoly investigation might burn a few witches—the said witches to be supplied by them. One wonders if any such tough executives will be tossed overboard by boards of directors to placate the witch hunters.

If it will be of any comfort to the timid, we hazard a guess that the investigation will have a great educational value to those who, without previous business experience, would regulate business completely; and that there will be very little witch burning.

» IN SPITE of outward signs to the contrary the Business Advisory Board is still functioning quietly and unobtrusively. This board, in case you have forgotten it, is the one that was appointed years ago to advise with Uncle Dan Roper and thus convey to official Washington the facts — not merely the opinions — about business.

Some day, if members of the board live long enough or if the President does not call in a host of new inexpert advisers, business and the Administration will understand each other. And then maybe something of national good, instead of political expediency, will come out of Washington. Let us pray for long life, endurance and continuity.

» ALWAYS there seems to be somebody in official Washington to give us the run-around. This time it is Dr. Thurman Arnold, the new Assistant Attorney General, author of "The Folk Lore of Capitalism" and chief anti-monopolist of the current crop of New Deal policy makers. In fact, he is

the one who hints he will give quite a show in his attacks on monopoly in business.

Early in May the Attorney General, himself, invited us to come down and

get first-hand knowledge. Therefore we tried to find out about the milk "monopoly" investigation which comes under Dr. Arnold's jurisdiction. All that could be found out was a policy order, dated May 18, 1938, signed by Attorney General Cummings but presumably written by Assistant Attorney General Arnold. This order was the official run-around. It precluded getting the facts which we had been previously invited to come after.

Ho Hum.

New Food Law, At Last

AT LONG LAST, after many a legislative battle, the Federal Food and Drug Law of 1906 has been replaced by a modernized statute. Its salient features have been officially summarized elsewhere in this issue of FOOD INDUSTRIES.

Its passage and executive approval almost coincided with the death of Senator Copeland who sponsored it in Congress. Lest the unthinking or forgetful believe that he started this revision, they should recall that Dr. Rexford G. Tugwell, then Assistant Secretary of Agriculture, was the one who initiated the movement culminating in that legislative monstrosity—S.1944, also known as the Tugwell bill (though Tugwell never wrote it).

The original version of S.1944 was not prepared by any member of Congress, but it could be introduced only by a member of Congress. You will probably recall that Congress was in special session in the spring of 1933. Several Senators were asked to introduce this ready-made bill, but one look at it was enough for most of them and each refused. Almost at the hour of adjournment, Senator Copeland was asked to introduce it. This, he agreed to do, but in offering the bill to the Senate, he publicly announced that he was doing so by request and that he had not even read the measure. Thus his name appeared on S.1944 even though he did not write it. And, having a bull by the tail, he could not let go. He was, however, active in rewriting it, and after the first few skirmishes in open hearings the food industries were fairly well satisfied with the bill. The violent opposition came chiefly from industries other than foods which come under its jurisdiction.

All persons connected with the food industries would have welcomed a separate food law, but the other industries put a stop to any such unbrotherly notions. Old pals must stick together, etc.

On the whole it is a satisfactory law and its enforcement is known to be in good hands as long as Walter G. Campbell and Dr. Paul Dunbar continue in charge of the Food and Drug Administration.

PPP—It's a Good Trick—If It Can Be Done

DAVID J. LEWIS, the Maryland congressman, who with New Deal blessing is opposing Senator Tydings in the Maryland primary elections in one of the most important political "purges" of the year, "humanizes" the scandalous government debt increase. This 16½ billion dollar increase, he says, is not so mountainous as many claim. "Let us assume that out of our population of 130,000,000 that 50,000,000 support themselves and thereby are the taxpayers. Divide that 50,000,000 into 16½ billions and what do you get? You get $350 apiece. How long would it take a person to pay this off? Well, exact computation shows that a payment of $1.58 a month for 25 years would discharge this debt and allow for the payment of 3 per cent interest.

"Is President Roosevelt and his forward-looking program worth $1.58 a month to you?

"Is $1.58 a month for 25 years a mountainous debt to leave our children and our children's children?"

Even the most reactionary, hidebound, anti-New Dealer would agree with that, if it contained the truth, the whole truth and nothing but the truth.

The weakness of all such statements, from the Tugwell days up to now, is the implied assumption that permanent prosperity is here from now on. If $1.58 a month would or could guarantee permanent prosperity why limit it to 25 years? Why not buy prosperity forever?

As usual with nearly all forms of installment buying, the thing purchased usually wears out or becomes obsolete before the payments are complete.

P.P.P. (Pump-Priming Prosperity)

Hors d'Oeuvres

• Headline:—"Tokyo Owns a Slaughterhouse." Somehow, that has a familiar ring.

• *The Reconstruction Finance Corp. has made several loans to the food industries, including an advance of $750 to the Pig and Pup Sandwich Shop at Bessemer, Ala. The loan probably was used to build a Hog and Dog Diner.*

• Thirty million hamburgers and frankfurters will be eaten at the New York World's Fair, 1939, it is estimated by Childs Co., which will dispense them. Apparently, there will be Pig and Pup Sandwich Shops all over the place.

• *The Department of Agriculture has received complaints from consumers and from the trade on the extent to which pits are found in so-called pitted and stuffed olives. Pity the people that pay for pits at the price of pimentoes, particularly when they prefer the pitted product.*

• California Walnut Growers' Association is reported to be experimenting with explosives as a method of cracking nuts. The method is to saw a fine opening in the shell, inject explosive gas, ignite it and blooey, you have big, whole kernels. Another method is to drill a small hole in each nut, put a quantity of the nuts in a chamber, apply compressed air until there is pressure inside as well as outside the nuts, release the pressure suddenly and let the shells crack open from the pressure within them. If you are fortunate enough to have a safe blower among your acquaintances, don't forget to have him over for Christmas. He'll save you no end of nut cracking.

• *There is now in the world one woman who knows a lot about food. And lest we incur the enmity of all the ladies of the land, let us hasten to explain that we mean a woman who knows a lot about food technology. The pioneer is Miss Nelly Armand-Ugon of Uruguay, who recently was graduated from the food products industries course of Oregon State College.*

• A bread company recently was sued because when a consumer took a bite of bran muffin "her teeth came in facile contact with a horseshoe nail." That is to say, she busted a molar.

• *There are eaten in this country annually about 10 billion loaves of bread. This is enough to encircle the earth at the equator 60 times, and would form a golden brown highway about 30 ft. wide. And what easy riding it would be.*

• Clarence Francis, President of General Foods Corp., in speaking before the National Association of Retail Grocers prefaced his address with a statement that he was just a prune peddler. Well, big men can afford to be modest.

is no different from other forms of human folly.

As we have remarked on previous occasions, give dear old *Homo sapiens* half a chance and he will mortgage his whole future for an illusion.

Reckless Driving

FOOD EXECUTIVES must take account of the new philosophy which will govern anti-monopoly action of the Government. Assistant Attorney General Thurman Arnold on July 7, states his view, which will govern future prosecutions, about as follows:

When a man starts out with an automobile, he does not intend to kill anyone. But sometimes he does. And then he must suffer the consequences of his act, often including criminal prosecution in the court. So, too, the industrial executive running his business. He may not intend to create monopoly. But if he does he will be criminally prosecuted.

This is a brief summary of the basis on which the Department of Justice initiated its effort during July to secure indictment and subsequent conviction of milk company executives in the Chicago district. It would be extremely important for other business men to consider their own executive actions from the standpoint, not of the motive, but rather as to the consequence in restraint of trade.

If there even *appears* to be such restraint of trade resulting, the Department of Justice is likely to prosecute.

The Market Rise

LAST AUTUMN we were at loss to give an explanation of the slump in the stock market. Which will explain our reluctance to speak openly on the subject.

And now we have seen the abrupt rise beginning in late June for which there are many theories, probably all of them being partly right and partly wrong.

The one that appeals to us most relates to the annual meeting of the Purchasing Agents Association in St. Louis in early June. Afterwards, each delegate reported to his principals that the general feeling was pessimistic, that everyone figured that hand-to-mouth future commitments were in order, that there were no favorable signs in the business skies. And, the story goes, the principals then decided that, such being the case, the bottom was here—that heavy forward commitments were in order.

At any rate, there were two weeks of very heavy buying of raw materials, especially metals, before the stock market reacted to it.

But, of course, plausible though that explanation may be, it utterly fails to explain why so many business heads all got the same notion at the same time. Maybe Mr. Roosevelt's pump priming operations added a trifling impetus to a gambler's instinct. Maybe some folks tried to beat the higher costs under the wages and hours law —like 1933—remember? The mass behavior of men is ever a matter of great wonder.

Obscure Cause of Flavor Disappearance

ONE OF THE MANY FACTORS that influence flavor in certain foods is the presence of minute amounts of acetyl-methyl-carbinol which is produced from dextrose and certain other carbohydrates by bacteria, *Aerobacter aerogenes* and *Aerobacter oxytocum.* The presence of acetyl-methyl-carbinol is probably a favorable factor in butter, bread, coffee, honey and beer. Indeed, it is one of the principal sources of the flavor of butter.

Unfortunately, however, about one-half of the various strains of the foregoing bacteria which create the flavor also possess the further ability to destroy it (Ralph Tittsler: *Journal of Bacteriology* 35, 157, 1938).

This rather fundamental discovery is important to those who are employing bacterial control for the production of the best possible flavor, for the wrong kind of "bugs" can undo the best efforts of the food technologist.

Just what can be done about it, if the wrong ones are present and destroy the flavor, we do not know. But the suggestion is given that here is a new way to account for flavor disappearance when, judged by previous knowledge, it ought to be the other way around. Our best advice is to be not discouraged.

The Fair Labor Standards Act of 1938

FOOD MANUFACTURERS doing interstate business are, for the most part, paying wage rates above those specified in the new Wages and Hours Law. This is particularly true of the larger concerns which have a wide public acceptance of their products. Some concerns may be forced to increase their production costs in order to comply. And the real burden will fall on sales departments to hold their volume despite the cost increases.

To advise manufacturers on what they may or may not do under the new law is a job for the lawyers. But sales and production executives should also study the law as a guide to their own planning. For example, an intrastate manufacturer must comply with the law for 90 days before he ships anything interstate; for the law says very plainly in Section 15 (b) that if any person was employed by the company for 90 days prior to shipment from the plant "that fact shall be prima facie evidence that such employee was engaged in the production of such goods."

Because the provisions of the law do not become effective until Oct. 24, 1938, some may believe that there is lots of time in which to get ready. Yet for reasons, such as the foregoing, compliance must have begun by July 24 in order to avoid difficulties on Oct. 25.

The law is a criminal statute. Penalties for violations are severe (fines up to $10,000 and imprisonment). And employees who are gypped can sue and recover double the unpaid minimum or overtime wages. Furthermore, you cannot fire them if they sue for back wages.

Certain exemptions as to maximum hours are permitted for outside salesmen, fishermen, canners, dairymen, dehydrators, freezers, cheese and butter makers; and for the first processing of whey, sugar beets, sugar beet molasses, sugar cane, maple sap, or any horticultural or agricultural product during seasonal operations, or poultry or livestock products.

It behooves every employer to study and master the complexities of the law. Plan seasonal production in such a way that the permitted fourteen weeks of exemption from overtime in any year are not used up. Otherwise overtime labor costs will jump to time-and-a-half rates. In seasonal industries next year the implications of the law call for an unusual degree of coordination of equipment and production schedules to avoid heavy penalties or overtime pay.

Our best advice is to study the law itself, and confer with your lawyers, keep adequate records, lean over backwards in its compliance, and pray that no one in the subordinate personnel pulls a boner.

Frozen Food Directory

FOUR DAYS after the April issue of FOOD INDUSTRIES was in the mails the entire issue was practically sold out. Those who still want the statistical insert on the frozen food business can obtain it separately—for a slight consideration.

NEW *Qualities* in SPICES

SPICES AND AROMATIC HERBS enter into the manufacture of food for the main purpose of adding to the flavor—the appetite-appealing properties—of the food.

This function of flavoring and seasoning materials holds true regardless of the form in which they may be used. However, like other ingredients of a mixture, they may give rise to incidental peculiarities in the final product which have no direct connection with the prized and characteristic properties of the ingredients themselves.

In some cases these peculiarities may be the incidental effect upon color, upon mixture uniformity or emulsion stability, upon the after-taste, or upon the general keeping qualities of the finished product. In the instance of spices and flavoring herbs, the imparted peculiarity may be an unsuspected and accidental micro-organism contamination resulting in a yeast, mold, or bacterial spoilage of the finished product.

Knowledge concerning the extent of this possible contamination has come pretty much as a surprise. Until comparatively recently, spices and similar essential-oil-containing materials were credited with having germicidal properties.

Over a period of several years various investigators have been gradually gathering information concerning the micro-organism content of spices and condiments and the causes of bacterial spoilage of foods containing them as flavoring and seasoning ingredients. The accumulation of this information has been painstaking, yet many facts, undoubtedly, are still undiscovered.

But enough knowledge has now been obtained for the food manufacturer to have a clearer understanding of this possible factor in food spoilage than he has had previously. Also, he now has available certain means which can help him to avoid any difficulties in his products that might be caused by the yeast, mold, or bacteria content of the native flavoring and seasoning material used.

Handled or processed in the light of even present-day knowledge and used in a manner to bring out their valued properties, these flavor-imparting spices and herbs may now safely perform the time-honored function intended for them: to serve as the agents of savor and consumer palate satisfaction.

Credit for uncovering the rôle played by spices and condiments in the micro-organism spoilage of foods should go to the bacteriologists of the meat packing and spice marketing industries and to the research men of the National Canners' Association. The results of their studies have been accumulating rapidly and the accomplishments of the chemists working with them have become important industrially.

Several spice handlers have already taken steps to insure the delivery of improved and standardized quality flavoring and seasoning materials to industry. We welcome the opportunity of making known to food manufacturers, in the following four articles, some of the accomplishments of these spice suppliers and processors, and of describing some of the equipment and methods used for the preparation of better flavoring and seasoning materials.

THE BREADTH OF INTEREST that all food manufacturers have in high quality spices and condiments is indicated by the accompanying chart listing about 40 of them and their major uses. Even though some lesser known spices and some spice uses may have been overlooked, this chart shows the almost all-food-industry importance of flavoring and seasoning materials and the industrial significance of their possible mirco-organism content.

Fortunately, at no time has this bacterial content involved any question of public health. But it has involved a number of questions important to industry. No food manufacturer wants to face the hazard of gas-forming thermophiles which may cause physical distortion of his product or its containers. Even more important is the problem of off-flavor products which may result from the presence of saprophytic, i.e., non-pathogenic, bacteria. Every spice user can avoid these possibilities by checking up on the flavorings and seasonings he uses to see that their bacterial content is within the range of good practice made possible by latest technological development in the spice and condiment industry.

Spices, Flavoring Herbs and Their Uses

STERILIZED SPICES:

New Factor in Food Quality Control

Reduction in micro-organism content of spices and flavoring herbs paves the way for less spoilage and improved eating quality in spice-containing foods.

By LLOYD A. HALL
Chief Chemist,
Griffith Laboratories, Inc.
Chicago, Ill.

HEAT TREATING OF MILK, cream, and cheese; pickling and smoking of fish and meats; drying, preserving and heat treating of fruits and vegetables, and freezing of various types of foods are all done in the interest of destroying or inactivating the micro-organism content of these foods. By so doing the perishability of the foods is decreased. At the same time the danger of bacterial infection resulting from the consumption of these foods is minimized.

During recent years progress has been made in the treatment of raw materials and ingredients for a reduction in their micro-organism content to the end that foods in which they may be used will not be unnecessarily contaminated with micro-organisms likely to cause spoilage or deterioration of quality.

Among the most recent of these materials or ingredients to be treated for a reduction in micro-organism content are spices and flavoring herbs. This treatment may seem a bit unusual because spices have generally been considered free from contamination and to possess antiseptic properties.

Why that opinion should be held is not easy to understand because vegetable matter is normally laden with micro-organisms. When it is dried or processed in an ordinary manner, the micro-organisms are quite likely to continue to exist in their dormant spore or modified forms. These dormant forms again become active when favorable conditions arise, such as occur when the dried vegetable materials containing them are moistened or put into moist foods.

As shown in Table I (a), fruits and vegetables, cereal flours, cocoa, and similar food materials are carriers of bacteria, molds and yeasts in a dormant state. Likewise spices, although used in small quantities, will inoculate a food-mix with bacteria, molds and yeasts if used in their customary commercial state. (Table I (b)).

Reported bacterial content of spices[1] indicate a wide variation in the contamination; in some cases it is very heavy. Investigations[2] on the antiseptic and preservative powers of both treated and untreated spices in several foods, especially in ordinary spice cake, show that spices present in palatable quantities have no effect upon the growth or death of micro-organisms present. Also baking experiments[2] give proof that a considerable number of bacteria in cake and bread doughs are not even killed by heat.

However, our experimental work evidenced that in particular cases fresh sausage seasoned with ground, treated spices kept approximately twice as long in normal storage as did sausage containing untreated spices. On the other hand, formation of gas in nitrate-nitrite sugar-cured chopped ham has been traced[3] to the spice mixture used. This was usually coriander and white pepper, and containing 5,000,000 spores of gas-forming bacteria per gram. These findings are significant in that these investigators[3] state that, "with trimmings free from CO_2-forming bacteria, sterilized spices, and microbially clean wrapping paper, a spiced ham may be produced with the nitrate-nitrite sugar cure that will not swell at 37.2 and 48.9 deg. C."

Rancidity in pork and in smoked sausages may have its relation to the use of contaminated spices. Certain strains of bacteria producing fat-splitting and oxidizing enzymes are reported[4] to appear responsible for rapid liberation of free-fatty acids and the formation of oxidation products.

Discoloration of cured meats and fresh sausage result from the action of oxidizing and hydrogen sulphide-forming micro-organisms[5] such as may be present in untreated spices.

Vapors from crushed garlic show bactericidal properties but boiled and autoclaved garlic loses those properties.[6] Garlic powder not only is lacking in germicidal and preservative

Based on a paper read before Midwest Section, American Association of Cereal Chemists, Chicago, Ill., Jan. 10, 1938.

Table I (a)—Micro-organism Counts on Commercial Samples of Untreated Foods

Food	Bacteria, per gram	Mold and Yeasts, per gram
Acacia (gum) powder	3,330	494
Apricots (dried)	195	75
Broccoli	32,800	120
Cocoa	627	10
Corn flour	18,000	110
Corn flour (processed)	5,000	10
Karaya (gum) powder	19,350	1,387
Prunes (dried)	40	28
Raisins (dried)	82	60
Soya flour	3,800	.....
Spinach	1,020,000	1,570
Strawberries (whole)	172,800	2,600
Tragacanth (gum) powder	14,540	70
Tragacanth (gum) ribbon	640	160
Wheat flour	13,000	.....

Table I (b)—Micro-organism Counts on Commercial Samples of Untreated Spices

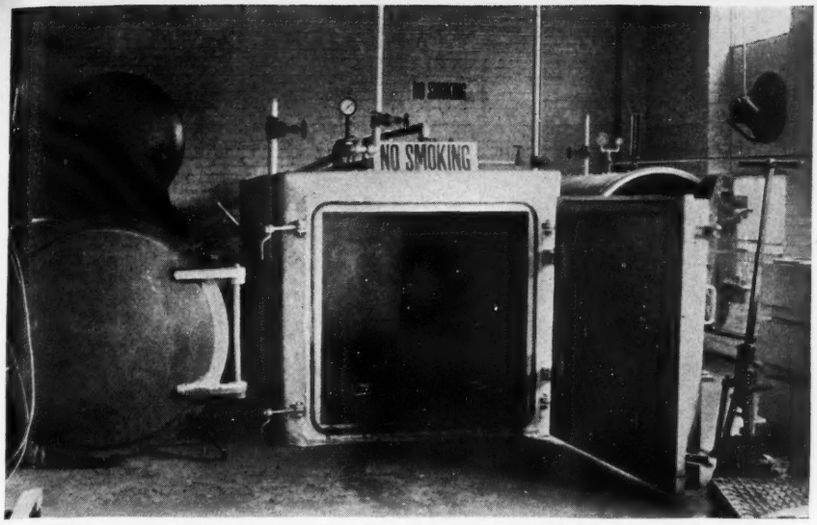
Spice	Bacteria, per gram	Mold and Yeasts, per gram
Allspice, (ground)	214,000	2,300
Cinnamon, (ground)	110,000	22,200
Coriander, (ground)	400,000	.....
Coriander, (whole seed)	190,000	4,640
Garlic, (ground)	5,775	.....
Ginger, (ground African)	2,100,000	.....
Nutmeg, (ground)	10,000	110
Paprika, (ground)	1,500,000	140
Pepper, (whole black)	2,770,000	90
Pepper, (whole Carolina red)	20,000	560
Pepper, (whole Cayenne red)	2,047,000	100
Pepper, (whole Japanese finger)	4,000	40
Pepper, (ground fine, red)	16,000,000	2,500
Pepper, (ground white)	158,000	2,220
Tumeric, (ground)	1,835,000	100

Table II—Micro-organism Reduction in Spices by Heat Treatment.[1]

(Average results obtained from more than 100 tests made in two years.)

Test No.	Spice	Untreated, count per gram	Treated, count per gram	Kill, per cent
1	African ginger	2,100,000	80,000	96.19
2	Fine red pepper	16,000,000	2,400,000	85.00
3	White pepper	80,000	12,200	84.75
4	Coriander	400,000	30,000	92.50
5	Nutmeg	10,000	Sterile	100.00
6	Cinnamon	110,000	7,000	93.64
7	Allspice	214,000	21,500	89.95
8	Paprika	1,500,000	300,000	80.00

[1] Autoclaved one hour at 248 deg. F. in 5-lb. friction-top tin can.



Sterilizing retort used at The Griffith Laboratories, Inc., in the treatment of spices.

▶ ***Use of carefully selected ingredients is one form of quality control that actually exercises a control over the quality of the finished product.***

Spices and flavoring herbs enter so generally into the composition of prepared and processed foods that treating these flavor-imparting ingredients to lower their micro-organism content without destroying their flavoring properties supplies a means of controlling the quality of products of

Most Food Manufacturers

properties as used in chopped meats but is often contaminated with micro-organisms as is onion powder. While onion vapors have bactericidal properties, their potency is not as strong as is that of garlic vapors.[7]

Sugar, when used in spice mixtures or in pickling, may be a source of bacterial contamination. Thermophilic bacterial contamination is not a stranger in sugar refineries[8] and has caused the spoilage of canned foods.[9]

Heat treatment and chemical treatment methods have been attempted as a means of reducing the micro-organism contamination of spices. While these methods are, in a measure, effective (Tables II and III) they have disadvantages.

Prolonged heat treatment causes an average loss of about 15 per cent in spice strength, a lightening in color in some cases and a darkening in others. Such gases as formaldehyde, carbon disulphide, carbon tetrachloride, and hydrocyanic acid, while partially effective in some cases and wholly effective in others, can not be fully removed with certainty and often impart an undesirable taste or odor. (Table IV.) Penetration of these gases into large bulk of materials treated also is not certain.

(*Turn to page 464*)

Table III—Micro-organism Reduction in Spices by Heat Treatment.[1]
(Average results obtained from more than 100 tests made in two years.)

Test No.	Spice	Parts by Weight	Untreated, count per gram	Treated: Count per gram, Top	Treated: Count per gram, Middle	Treated: Count per gram, Bottom
1	White pepper	7	100,000	Sterile	22,600	8,850
	Coriander	1				
	Nutmeg	2				
2	White pepper	1½	119,000	Sterile	35,000	12,950
	Coriander	1				
	Nutmeg	2				
	Paprika	½				
3	White pepper	6½	240,000	Sterile	70,000	60
	Coriander	1				
	Nutmeg	2				
	Red pepper	½				
4	Red pepper	.....	16,000,000	889,000	2,600,000	69,000
5	Paprika	.....	1,500,000	35,000	124,000	16,000

[1] Autoclaved two hours at 240 deg. F. in 25-lb. lard cans sealed airtight with solder.

Table V—Micro-organism Reduction in Spices by Electrical Treatment.[1]

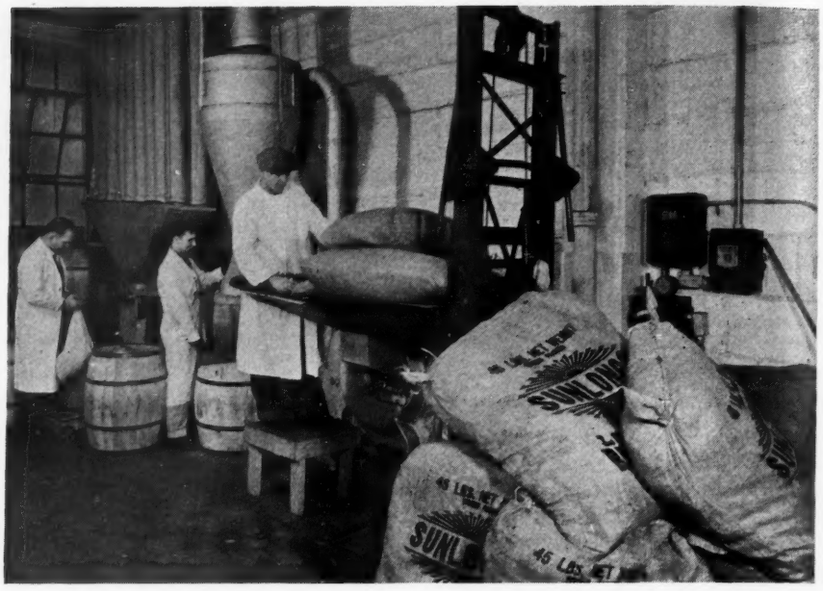
Spice	Untreated, count per gram	Treated, count per gram	Kill, per cent	Untreated, mold count	Treated, mold count	Kill, per cent
Ground red pepper	2,770,000	1,850,000	33.22	1,300	340	73.85
Ground paprika	440,000	272,000	38.07	140	90	35.71
Ground coriander	22,000	22,000	.....	.....	.....	.....
Hansa bologna mixture	210,000	129,500	38.35	2,350	1,430	39.15
Ground white pepper	158,000	79,000	50.00	2,220	2,220	0

[1] Subjected to passage of electrical current through 1½-lb. samples in cylindrical cardboard containers.

Table IV—Micro-organism Reduction in Spices by Chemical Treatment

Test No.	Spice sample	Reagent	Treatment	Untreated, count per gram	Treated, count per gram	Kill, per cent	Formaldehyde, Residue Test
1	100 gm. Hansa bologna[1]	5% Sol. formaldehyde	Gas into agitated sample 30 min.	380,000	190,000	50.0	negative
2	100 gm. Hansa bologna	15% Sol. formaldehyde	Gas into agitated sample 30 min.	380,000	.....	100.0	highly positive
3	100 gm. Hansa bologna	15% Sol. formaldehyde	Gas into agitated sample 20 min. Washed with air.	380,000	50,000	87.0	positive
4	50 gm. Hansa bologna	15% Sol. formaldehyde	Gas into shaken sample 45 min.	380,000	95,000	75.0	positive
5	20 gm. Hansa bologna	0.5% para formaldehyde	Gas into flask	380,000	62,000	84.0	positive
8	100 gm. Hansa bologna	1.0% para formaldehyde	Electric laboratory oven 20 min. at 100° C.	380,000	86,500	77.0	positive
9	100 gm. Hansa bologna	2.0% para formaldehyde	Autoclave 25 min. at 220° F.	380,000	16,300	95.7	positive
10	100 gm. Hansa bologna	5.0% para formaldehyde	Autoclave 20 min. at 225° F.	380,000	3,450	99.1	positive
11	100 gm. Hansa bologna	2.0% para formaldehyde	Autoclave 1 hr. at 230° F.	380,000	6,800	98.2	positive
6	25 lb. Hansa bologna	1.0% para formaldehyde	Rotary dryer 1¼ hr. at 250° F.	380,000	.....	100.0	positive
12(a)	50 gm. Hansa bologna, 50 gm. red pepper	6% para formaldehyde	Electric lab. oven 1 hr. at 220° F.	6,100,000	438,000	92.8	positive
12(b)	50 gm. Hansa bologna, 50 gm. red pepper	6% para formaldehyde	Autoclave 1 hr. at 212° F.	380,000	18,250	95.2	positive
13(a)	50 gm. Hansa bologna	10% para formaldehyde	Autoclave 2 hr. at 220° F.	380,000	6,750	98.2	positive
13(b)	50 gm. red pepper	10% para formaldehyde	Autoclave 2 hr. at 220° F.	6,100,000	162,500	97.3	positive
14	50 gm. Allspice	4% para formaldehyde	Under inverted dish in oven 18 hr. at 200° F.	134,000	6,000	95.5	positive
15	50 gm. Coriander	4% para formaldehyde	Under inverted dish in oven 18 hr. at 200° F.	90,000	7,000	92.3	positive
16	25 lb. red pepper	0.5% para formaldehyde	Rotary dryer ¼ hr. at 225° F.	9,175,000	740,000	91.9	negative

[1] "Hansa bologna" is a mixture of six spices.



Preparatory to solvent extraction, the dry spices and herbs are ground to the desired fineness on a standard swing hammer mill equipped with a dust collector and are weighed into porous cotton bags.

Putting SPICE FLAVORING *Under Control*

Transfer of spice and herb flavoring or seasoning constituents to a soluble carrier helps to put food flavoring on a controllable basis.

By ALADAR FONYO

Chief Chemist,
Wm. J. Stange Co.
Chicago, Ill.

► ***Standardization of major ingredients used and of processing conditions specified for the making of foods is a move in the right direction for improved food quality.***

With the consuming public becoming increasingly flavor-conscious, more attention to the standardization of the minor ingredients and to the incidental handling of the products is of growing importance.

What has been done for the standardization of spice and herb flavors and seasoning embodies suggestions of what might be done in connection with other minor ingredients affecting product quality of

All Food Manufacturers

ADDITION OF FLAVORING MATERIALS to a food is for the purpose of increasing its appeal to the taste senses.

They are used in such low concentrations that they contribute little to the bulk of the product in which they are used. Also, in themselves, they add very little if anything to the nutritive value of a food in an energy-giving or tissue-building sense. Their presence in any particular food is solely for the purpose of giving that food a flavor or taste identification which will create and hold a consumer demand for it.

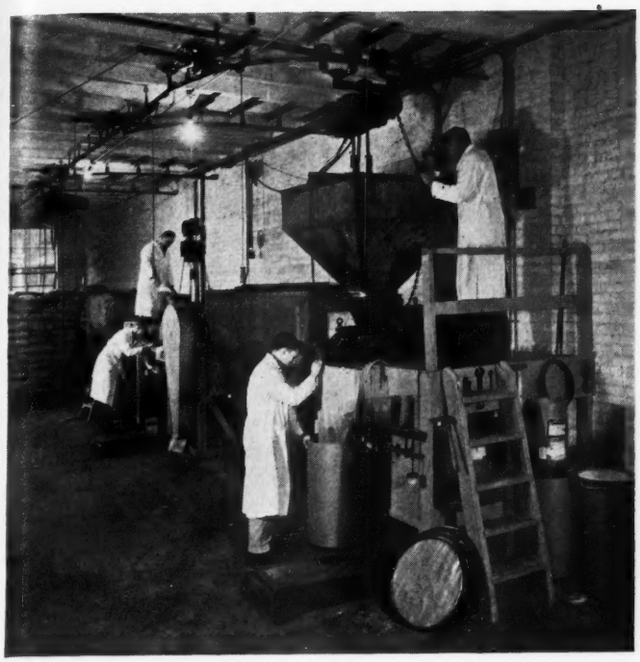
In the interest of high quality flavoring or seasoning, both uniformity of strength and absence of contaminants should be taken into account when selection and use of the flavoring or seasoning ingredients are made.

Whether the flavoring or seasoning ingredients are of fruit, seed, root, flower, or herb type, the resultant flavor of the product in which a definite percentage content of them are used can be of no more uniformity and of no higher quality than are the flavoring or seasoning materials used. The vagaries of nature and variations in geography, climate and soil make impossible the growing or harvesting of fruits, spices, herbs and the like which are strictly uniform in flavor or seasoning properties or powers. Contamination by foreign substances and micro-organisms is also very much of a variable and sometimes of surprisingly high concentration.

Attempts have been made to remedy the shortcomings of these materials in their natural state by washing, mechanical cleaning, grading and careful storing wherever such procedures could be exercised. There still remained the unpredictable variations which prevent adoption of a highly standardized practice for the flavoring or seasoning of any food by any of these materials.

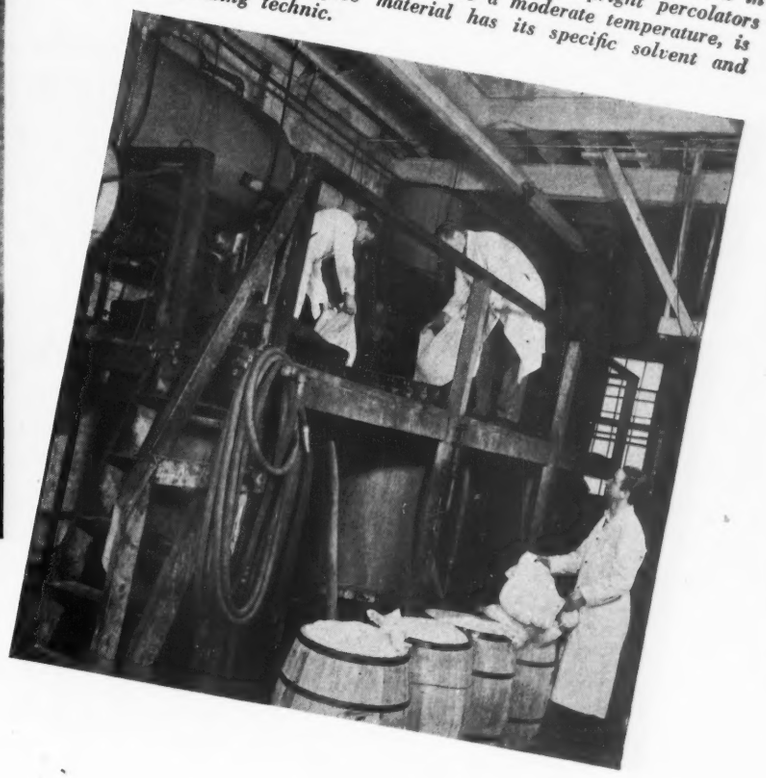
In the case of fruits, vanilla beans and the like, resort has been made to the preparation of essence or extracts. For many years, well-defined technic has been known and practiced for the preparation and use of such flavoring

[1] U.S. Patents No. 1,781,154 granted Nov. 11, 1930 and No. 2,079,415 granted May 4, 1937.



After removal of solvent under vacuum, the liquid spice extractive is thoroughly mixed with a dry, water-soluble carrier, such as salt or dextrose, in a spiral-ribbon mixer. The mixture is ground to flour-like fineness on a cool-running pulverizer and packaged for shipment and stock in a water- and oil-resistant fiber drum.

Cotton bags containing ground spice material are placed in layers on perforated trays in vapor-tight upright percolators into which the solvent, heated to a moderate temperature, is sprayed. Each spice material has its specific solvent and percolating technic.



materials in which foreign substances and micro-organism contamination have been reduced to a negligible level. Also, standardization of flavoring strength of the materials has been accomplished.

For some reason or other, spices and herbs, until comparatively recently, have been considered too sacred or too deeply rooted in tradition and romance to be dealt with in a similar manner for the purpose of putting their flavoring or seasoning strength on a standardized basis and eliminating their contaminants.

This is so in spite of the vital importance of spices in the manufacture of food products. Surprisingly little scientific work has been done in the past toward control in their preparation. We know how to detect adulteration and impurities, how to determine ash, starches, nitrogenous substances, fibers, and the volatile and non-volatile ether extracts by analysis. But what will these analytical data tell us? They tell us that spice is either within the Federal standards as defined by the United States Department of Agriculture, or is not. They will not tell us about its flavor; the thing we are mostly interested in.

As an example, take red or Cayenne pepper. An analysis shows that it may contain 15 per cent of ether extract. Another batch of Cayenne pepper may also have 15 per cent ether extract but one may be three times hotter than the other. The usual analytical data can not indicate the quality or the strength of the flavor of the spice.

There is another important factor that has to be taken into consideration in connection with food seasoning. Spice may be added to the food and may carry all the flavor that is required, but the spice has value only when the flavor makes an impression on the palate. To illustrate this point: when a bitter medicine is swallowed in a capsule it does not taste bitter because the capsule protects it from contact with the palate. Similarly, not all the flavors of the spices added to foods are tasted; they remain enclosed in their fibrous carrier.

Because of that fact it is apparent that the difficulty in maintaining a uniformly seasoned food product lies in the variation of the flavoring strength of ground spices and in the variation with which these flavors register on the palate. How to standardize each spice flavor and to make it fully available to the palate during the eating of the food in which it is used has been a big problem to solve.

The first attempt was to use the essential oils of spices for the flavoring of food products. These essential oils are obtained from ground spices by a process of steam distillation. They are powerful in flavoring strength and are used mostly in diluted form. One way of diluting them is to dissolve them in alcohol or other solvents. Another method is to disperse them in emulsions. In either form they have advantages over ground spices when the distribution of flavor and the appearance of the finished product are of important consideration. Their disadvantage lies in the fact that they represent only part of the flavor of the spices, the volatile part, and do not possess the rounded-out, full, rich flavor of the spices themselves.

Another method of processing the spices had to be found. Long experience with flavors was of great help in finding a method of overcoming the defects of essential oils. Percolating of vanilla beans to get a dependable and a standard vanilla flavor suggested that method of dealing with ground spices. The principal flavor in vanilla extract is vanillin. However, a solution of vanillin does not have the rich flavor of the alcoholic extract of vanilla beans. Ice cream flavored with vanillin solution does not have the

(*Turn to page 467*)

Reducing *the Microbial Content*

Results of laboratory tests on treated and untreated samples show effectiveness of ethylene oxide treatment

By L. H. JAMES
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SOURCES OF MICROBIAL CONTAMINATION in food manufacture have become one of the most important factors in quality preservation. The modern packer, instead of simply increasing the processing times and temperatures in order to control new and more resistant types of spoilage, consults the laboratory and endeavors to determine which ingredient or factory operation is responsible for the contamination.

Certain spices have been known for decades to carry relatively large numbers of bacteria, yeasts, or molds, which until recently have not been considered important in food production. A wide variety of microorganisms is usually found on the highly contaminated spices and includes (1) saprophytic bacteria, yeasts and molds which do not ordinarily cause spoilage unless present in great numbers, and (2) thermophilic bacteria (of which both the vegetative cells and the spores are unusually resistant to heat) which may survive the operations of food manufacture, producing spoilage during subsequent storage.

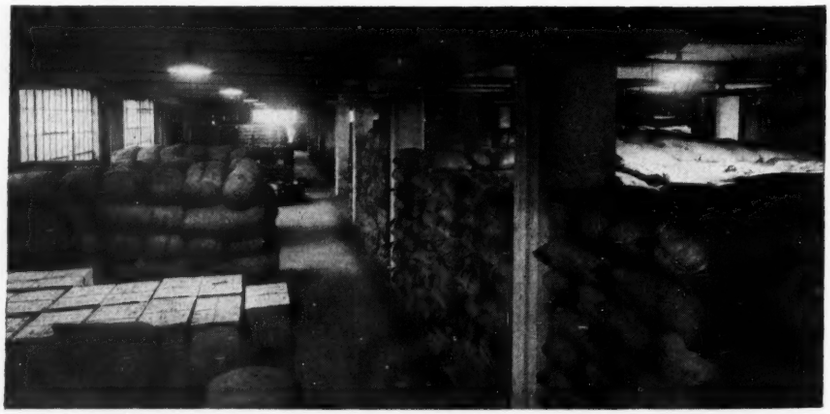
The amount of "good housekeeping" necessary to prevent spoilage by the first group is dependent somewhat upon the total numbers of microorganisms present, which is determined by the amount of microbial contamination introduced with raw materials and the amount of multiplication promoted within the factory operations. It is an axiom of the bacteriologist that, the greater the numbers of living bacteria present, the more difficult it becomes either to control fermentation or to bring about sterilization. For example, Kloss[3] reported studies on the use of mustard oil on the yeasts growing in grape wine must. It was most effective when the must was not actively fermenting. Therefore, the introduction of relatively large numbers of bacteria into food products may lead to serious difficulties, whereas only a small number of those same bacteria might present far less of a problem.

In the case of spoilage by the second group, a careful analysis of all sources of contamination and all operating conditions contributing to thermophilic growth is necessary. The mere presence of thermophilic spores in a raw material does not indicate that that material will lead to spoilage in a finished food product. If the conditions of manufacture of the food are such as to promote the growth of these thermophilic spores, spoilage may result. Hence the elimination of the spores from the raw material is a desirable safeguard.

The use of heat or disinfectants or other methods generally applied for the elimination of bacterial contamination are usually unsuitable as a treatment for reducing the microbial content of spices. Spice oils, being aromatic and readily volatile, are quickly driven off from the spice on the application of heat, and no practical method of sterilization using the ordinary chemical disinfectants has yet been devised. Therefore, the effectiveness and practicability of the new method of killing micro-organisms with small concentrations of ethylene oxide is of special interest to the entire food industry.

So recently has interest been developed in this problem that, although numerous investigations have been made of the preservative action of spices (James[2]), very little attention has been devoted to the bacteria of the spice itself and to methods for their removal. In the conduct of the earlier investigation, the writer found that no method had been devised for the sterilization of spices, and a procedure of exposing the spice to formaldehyde for several hours, followed by removal of the formaldehyde by aeration, greatly reduced the bacterial numbers in the spices.

In 1937, Cameron[1] reported the results of a bacteriological survey of 106 samples of spices. Black pepper was the most heavily contaminated, ranging from 1,000,000 to 16,000,000 bacteria per gram. The following year, the formaldehyde and ethylene oxide treatments and other procedures of possible disinfecting value were



Long-time warehousing is necessary in the spice industry. This aggravates the problem of spice contamination, makes special treatment for micro-organism control important.

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3. Kloss, J.—Uber den Einfluss von Chloroform and Senföl auf die alkoholische Gärung von Traubenmost. *Zeit f. Garungs-physiologie,* IV (April, 1914, 185–93.
4. Yesair, J. and E. J. Cameron—Present Status of the Sterilization of Spices. *The Canner,* Convention Number (Feb. 26, 1938) p. 108–110.

of SPICES

studied further by Yesair and Cameron [4]. They used formaldehyde, ethylene oxide, ethyl formate, heat and ether. In the case of formaldehyde, simple exposure to the chemical for 24 hours at room temperature reduced the total count of vegetative cells and spores to one-half the original. Different combinations of formaldehyde with and without a vacuum, held at various temperatures for 24 hours, showed a marked reduction in total count, the amount of reduction increasing with higher temperatures. No results of the influence of the heat and vacuum upon the essential oil content of the spice were reported.

Their treatment with ethylene oxide, carried out at room temperature, 37, 50 and 80 deg. C., reduced the total counts by more than 99 per cent and practically eliminated all bacterial spores. Ethyl formate and ether proved only slightly germicidal. While, as would be expected, sterilization by steam heat proved possible, such data as they give do not indicate its practicability, since the methods of determining the influence of the heat upon the spice flavoring oils were confined to judging the flavor of the various samples when mixed with ground beef, which was then cooked.

The growing interest in the development of a treatment that will effectively and materially reduce the microbial content of ground and whole spices without injury to or removal of the flavoring oils, led to a compilation of such preliminary data as is so far available on the commercial application of the ethylene oxide process.

The data presented in the accompanying table represent analyses in this laboratory of samples made available for this report and the privilege of including the results in this discussion is appreciated. The results are of the analyses of 55 samples of spice examined both before and after treatment in a semi-commercial apparatus. The marked reductions in total bacterial and yeast and mold counts, and the complete elimination of flat sour thermophiles from all but one product are striking. It is unfortunate that, in the examinations of certain of the untreated samples, the dilutions were not made sufficiently high to permit counting of the colonies on the agar plates, but in every instance the total numbers of bacteria, yeast or mold were far greater than those of the treated samples.

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Analyses of Treated and Untreated Samples of Spices, Treatment by Ethylene Oxide Method.

Sample No.	Spice	Total Bacteria		Molds and Yeasts		Flat-sour thermophiles	
		Untreated	Treated	Untreated	Treated	Untreated	Treated
1	Whole Black Pepper	T. N. T. C.*	200	T. N. T. C.	0	T. N T. C.	0
2	Whole Dill Seed	32,000	0	1,600	0	0	0
3	Whole Cloves	600	0	400	0	0	0
4	Whole Rosemary	4,000	0	8,300	0	0	0
5	Whole Cassia	18,000	0	100	0	0	0
6	Whole Anise	16,000	200	700	0	200	0
7	Whole Ginger	700	300	0	0	0	0
8	Whole Allspice	10,000	0	7,500	0	500	0
9	Whole S. Marjoram	53,000	300	4,500	0	0	0
10	Whole Coriander	600	200	0	0	0	0
11	Whole Savory	45,000	0	4,600	0	0	0
12	Whole Caraway	1,300	300	0	0	0	0
13	Whole Thyme	35,000	200	5,000	0	17	0
14	Batavian Stick Cinnamon	7,000	0	2,300	100	0	0
15	Whole Celery	320,000	800	T. N. T. C.	0	T. N. T. C.	0
16	Whole Mint	200,000	8,000	100,000	100	3	17
17	Whole Nutmeg	3,000	2,500	0	0	0	0
18	Whole Mace	9,000	200	400	0	0	0
19	Whole Cumin	95,000	200	15,000	0	0	0
20	Whole Red Pepper	1,500	0	600	0	0	0
21	Whole White Pepper	7,000	200	14,000	0	0	0
22	Whole Mustard	3,300	2,000	400	370	0	0
23	Cream Tartar	100	0	0	0	0	0
24	Ketchup Spice	80,000	0	47,000	0	3,000	0
25	Pumpkin Pie Spice	90,000	0	83,000	0	7,300	0
26	Curry Powder	T. N. T. C.	800	35,000	400	5,000	0
27	Allspice	70,000	200	T. N. T. C.	100	21,000	0
28	Poultry Seasoning	36,000	1,700	7,600	800	0	0
29	Nutmeg	53,000	2,800	11,000	2,300	200	0
30	Black Pepper	1,400,000	4,000	4,100,000	0	200,000	0
31	Tumeric	95,000	2,000	56,000	0	0	0
32	White Pepper	80,000	2,300	80,000	0	0	0
33	Cinnamon	28,000	300	1,500	0	0	0
34	Mustard	8,000	900	0	0	400	0
35	Ginger	T. N. T. C.	3,000	72,000	0	3,000	0
36	Sausage Seasoning	95,000	900	0	0	4,000	0
37	Fennel Seed	10,000	500	0	0	300	0
38	Ceylon Cinnamon	21,000	400	0	0	0	0
39	Saigon Cinnamon	11,000	400	0	0	0	0
40	Cake and Pastry Spice	T. N. T. C.	500	8,000	0	18,000	0
41	Leaf Sage	2,400	700	0	0	0	0
42	Crushed Red Pepper	T. N. T. C.	5,000	10,000	0	8,000	0
43	Pickle Spice	20,000	800	3,000	0	1,000	0
44	Sage	13,000	1,000	1,100	100	0	0
45	Cardamom	1,500	6,000	0	0	0	0
46	Paprika	25,000	500	0	0	0	0
47	Chili Powder	T. N. T. C.	40,000	1,300	0	0	0
48	Cloves	1,400	0	0	0	0	0
49	Maces	e1,000	300	100	0	0	0
50	Red Pepper	7,500,000	11,000	100,000	200	60,000	0
51	Whole Bay Leaves	23,000	100	0	0	300	0
52	Whole Mustard	0	400	0	0	0	0
53	Onion Salt	50,000	500	12,000	0	300	0
54	Celery Salt	550,000	600	100	0	0	0
55	Garlic Salt	1,300	300	100	0	200	0

** T. N. T. C.— Too numerous to count in 1–1000 dilution, therefore, probably more than 300,000 per gram.*

Automatic Equipment for SPICE FUMIGATION

First Commercial installation of new method installed by McCormick & Co.

CHEMICAL ENGINEERING has come to the aid of the spice grinder with an elaborate automatic equipment for treating spices to insure freedom from objectionable contamination. It has been generally known only in recent years that many spices required treatment in order to eliminate bacteria, molds, and spores which, if remaining in the spice, might subsequently produce objectionable effects in the products of the spice user. Adaptation of methods long proven successful for vacuum fumigation and insect control give the basis for this new spice-treating technic.

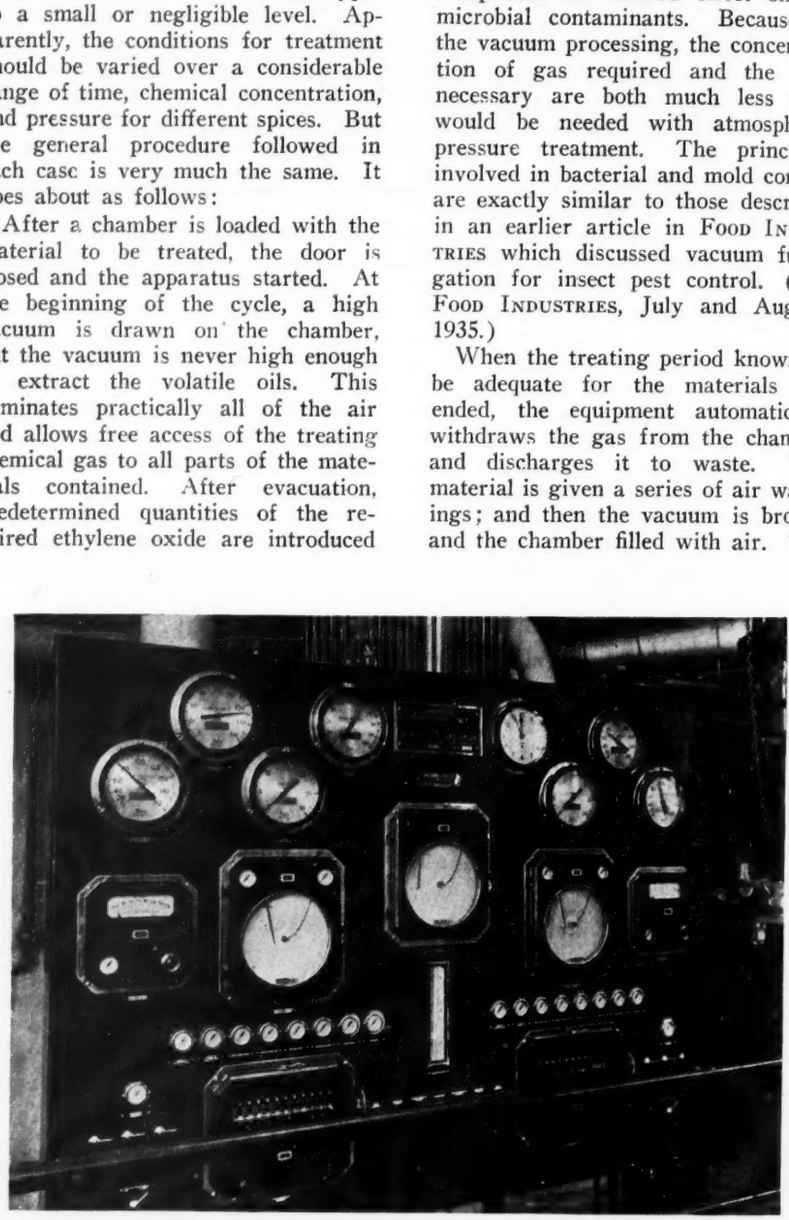
Sterilization of many food materials is accomplished simply by heat. This treatment is not usually adaptable to spice and other savory materials because of the resulting loss in flavor, especially those delicate constituents which give valuable aroma. Even mild treatments at slightly elevated temperature, analogous to pasteurization for milk, must be used with caution and under closely controlled methods when applied to spice. But heat with the aid of chemicals does accomplish many results of great value. The new technic which has been developed by Guardite Corporation for spice grinders affords just such an unusually effective combination of chemical and thermal processing.

The first completely automatic installation for food sterilization has been installed by Guardite for McCormick & Co., Baltimore, and is now beginning service for spice treating. That equipment consists of vacuum chambers in which the chemical and thermal processing will take place. Plant workmen load these chambers in turn with whatever material it is desired to treat in bags, boxes, barrels, or finished customer containers.

It has been established by bacterial studies, reported by Professor James elsewhere in this issue, that the results of chemical and thermal treatment are adequate to eliminate thermophilic bacteria completely and to reduce the content of all other types to a small or negligible level. Apparently, the conditions for treatment should be varied over a considerable range of time, chemical concentration, and pressure for different spices. But the general procedure followed in each case is very much the same. It goes about as follows:

After a chamber is loaded with the material to be treated, the door is closed and the apparatus started. At the beginning of the cycle, a high vacuum is drawn on the chamber, but the vacuum is never high enough to extract the volatile oils. This eliminates practically all of the air and allows free access of the treating chemical gas to all parts of the materials contained. After evacuation, predetermined quantities of the required ethylene oxide are introduced automatically. Then follows the treating period during which the gas accomplishes its desired effect on the microbial contaminants. Because of the vacuum processing, the concentration of gas required and the time necessary are both much less than would be needed with atmospheric pressure treatment. The principles involved in bacterial and mold control are exactly similar to those described in an earlier article in FOOD INDUSTRIES which discussed vacuum fumigation for insect pest control. (See FOOD INDUSTRIES, July and August, 1935.)

When the treating period known to be adequate for the materials has ended, the equipment automatically withdraws the gas from the chamber and discharges it to waste. The material is given a series of air washings; and then the vacuum is broken and the chamber filled with air. The



Typical control panel as used in an installation similar to the McCormick installation described in this article. Note the indicating and recording instruments. The two large units at the bottom are cam control timers. Copper tubes at the top run to air-controlled valves at all points on the apparatus. At right is back view.

doors are then released and the goods can be removed for further processing or for warehouse storage or sales purposes.

In another of the articles in this issue, Dr. Hall describes the history of the use of ethylene oxide for a variety of purposes. His company was among the first to use this gas for spice treating and he and his associates have obtained a patent on one of the conditions which they believe to be advantageous for this purpose. It is evident, however, that the new type of equipment at the McCormick plant need not be limited to any one condition of operation. The technical men who have the responsibility for supervision of this work will be able to adjust its functioning as may be required for various materials or as later scientific research may indicate improvements in technic are possible. Maintenance of full flavor and color values will be important; and results to date show that these will be readily maintained.

The locked control units determine the succession of valve operations on chemical, steam, and vacuum lines. This succession, constituting a complete cycle, can be changed only by those who have a key to unlock the automatic cam unit. On a single rigid shaft are all of the cams which give the contacts necessary for the functioning of the apparatus. These may be changed in relative position or one cam may be slipped off and another substituted if necessary. After such change the apparatus takes the full responsibility of carrying out the operation in just the manner that it has been constructed to do.

The apparatus is so arranged that there is visual indication for each unit as to exactly the conditions at each important point in the system. A chart record is made of the performance in the chamber, by pressure record, so that the laboratory has a permanent file showing exactly what happened in the treatment of each lot which has been in the chamber. There is no doubt afterward as to whether the apparatus did what it should.

The control board which accomplishes all the marvels of automatic performance is comparatively simple

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on the front. Its back would be an artisan's nightmare for anyone not familiar with the detail of assemblies. Fortunately, the operators, even the supervisory and technical men, need not worry about this feature because this general type of equipment used in other connections has proven its durability and its capacity to function for long periods without any special servicing.

Automatic control of all the functioning of the apparatus is more than a convenience. It is practically a necessity. It would not be feasible to assign to equipment of this sort the necessary number of scientific control men to be entrusted with the details of continuous attention to the apparatus and performance of the various operations in exactly the succession necessary. The cost for such technical employees would be prohibitive. And even were they available at reasonable cost, their service would not be as safe nor as certain as the automatic machinery itself. The human element might actually be dangerous because the dozens of operations must be carried out in exactly the right sequence in order to avoid improper flow of the fumigant gas, leakage, and possible production of explosive mixtures of the ethylene oxide with air. The latter would be very serious, because an explosion might then follow were there any source of ignition even so small as a static spark. The human operator, though most careful and skillful, might occasionally forget. The interlocks of the apparatus make forgetting impossible under the automatic setup, so that the installation was approved by the insurance underwriters.

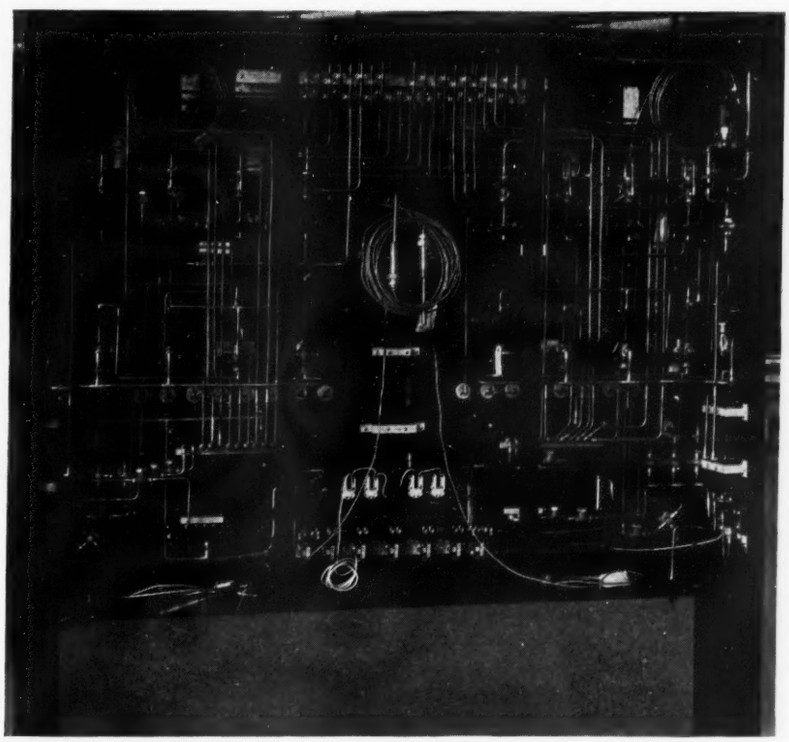
The whole operating mechanism is actuated by an electric clock. Hence failure of the power supply merely suspends operation at the point when this occurs, without hazard. When the power comes on again the apparatus picks up where it left off and completes whatever operation was in process. Check valves are so arranged that if operation is so suspended there can be no reverse flow of gas or accidental production of air-chemical mixtures.

All of the valves, including the locks on equipment and door-operating mechanism, are driven by compressed air. If there is a failure of the air pressure, all valves are so devised that they will close or open into the "safe" position.

As yet no operating results of this new completely automatic apparatus can be reported because of its recent completion. An elaborate plan for experimental operation on a wide variety of materials has been devised and precise control by both bacteriologists and spice experts is planned.

The preliminary results reported in the article by L. H. James in this issue of FOOD INDUSTRIES show convincingly that spices so treated can be given proper microbial condition.

(*Turn to page 468*)



Highlights of *NEW* FOOD LAW

Official digest of its provisions

The new Federal Food, Drug and Cosmetic Act became law on June 25, 1938, when it was signed by the President. Its general provisions will become effective one year from that date. Certain provisions, which will be discussed later in this article, become effective immediately.

The new law preserves the worthy features of the Federal Food and Drugs Act of June 30, 1906. In its principal differences from the old law it:

1. Brings all cosmetics except toilet soap under control [sec. 201(i)]; outlaws cosmetics which may be injurious to users, except poisonous coal-tar hair dyes which bear warning labels [sec. 601(a)]; prohibits false or misleading labeling [sec. 602(a)].

2. Prohibits traffic in food which may be injurious to health [sec. 402(a) (1)]. (The old law prohibits injurious food only when the poisonous substance is *added.*)

3. Prohibits the addition of poison to food except where such addition is required in the production thereof or cannot be avoided by good manufacturing practice; where added poisons are so required or cannot be so avoided, tolerances are authorized limiting the amount to a point insuring protection of public health [sec. 402(a) (2), sec. 406(a)].

4. Authorizes emergency permit control of food that may be injurious because of contamination with microorganisms, if public health cannot otherwise be protected [sec. 404].

5. Forbids traffic in confectionery containing metallic trinkets and other inedible substances [sec. 402(d)].

6. Specifically requires label declaration of artificial coloring, artificial flavoring and chemical preservatives in food, but exempts butter, cheese and ice cream from this requirement in so far as artificial coloring is concerned [sec. 403(k)].

7. Requires labeling of special dietary food to inform purchasers fully of its vitamin, mineral and other dietary properties [sec. 403(j)].

8. Provides for the promulgation of a definition and standard of identity and a reasonable standard of quality and fill of container for each food, but exempts from this provision fresh and dried fruits and vegetables, except avocados, cantaloupes, citrus fruits and melons [sec. 401, sec. 403(g), (h)]. Butter is also exempt from this provision, but the act preserves the statutory definition and standard of identity for butter which became law in 1923 [sec. 902(a)]. (The old law contains no authority for the establishment of definitions and standards of identity, and the authority to establish standards of quality and fill of container is limited to canned foods.)

9. Requires the labeling of food for which no definition and standard of identity has been fixed to disclose the ingredients by name, except spices, colorings and flavorings, which may be declared simply as spices, colorings and flavorings. Authorizes regulations prescribing exemptions from this requirement where compliance is impracticable or results in deception or unfair competition [sec. 403(i)].

10. Does not contain the "distinctive name" joker of the old law under which any mixture or compound of food not injurious to health can escape control.

11. Brings under control drugs used in the diagnosis of disease and drugs intended to affect the structure or any function of the body [sec. 201(g) (2), (3)].

12. Brings therapeutic devices under control, and subjects them to the same general requirements as are set up for drugs [sec. 201(h), secs. 501, 502].

13. Prohibits traffic in drugs and devices which are dangerous to health under the conditions of use prescribed in the labeling [sec. 502(j)].

14. Prohibits traffic in new drugs unless such drugs have been adequately tested to show that they are safe for use under the conditions of use prescribed in their labeling; authorizes exemption from this requirement of drugs intended solely for investigational use by qualified scientific experts [sec. 505].

15. Makes the Homeopathic Pharmacopoeia of the United States the legal standard for homeopathic drugs [sec. 201(j), sec. 501(b)].

16. Requires labels of official drugs —i.e., drugs recognized in the United States Pharmacopoeia, National Formulary or Homeopathic Pharmacopoeia of the United States—to reveal any differences of strength, quality or purity from the official standards [sec. 501(b)]. (The old law requires merely that the label bear a true statement of the strength, quality and purity of the drug, without showing the difference from the official standard.)

17. Requires drugs intended for use by man to bear labels warning against habit formation if they contain any of a list of narcotic or hypnotic habit-forming substances, or any derivative of any such substance which possesses the same properties [sec. 502(d)].

18. Requires the labeling of drugs and devices to bear adequate directions for use, but authorizes regulations exempting drugs and devices from this requirement where it is not necessary for the protection of the public health [sec. 502(f)].

19. Requires the labeling of drugs and devices to bear warnings against probable misuse which may be dangerous to health [sec. 502(f)].

20. Requires special precautionary labeling for drugs that are liable to deterioration [sec. 502(h)].

21. Does not contain the fraud joker in the old law under which the Government must prove that false

claims of curative effect on the labels of patent medicines were made with willful intent to deceive.

22. Requires official drugs to be packaged and labeled as prescribed by the Pharmacopoeias and Formulary [sec. 502(g)].

23. Declares non-official drugs illegal if the standard of strength thereof differs from the standard claimed [sec. 501(c)]. (The old law prohibits only those which *fall below* the strength claimed.)

24. Requires that antiseptics possess germicidal power [sec. 201(o)].

25. Requires the labels of non-official drugs to list the names of the active ingredients, and in addition to show the quantity or proportion of certain specified substances. Authorizes regulations prescribing exemptions from this requirement where compliance is impracticable [sec. 502(e)].

26. Proscribes the use of containers for food, drugs and cosmetics which may render the contents injurious to health [sec. 402(a) (6), sec. 501(a) (3), sec. 601(d)].

27. Prohibits traffic in food, drugs and cosmetics which have been prepared or handled under insanitary conditions that may contaminate them with filth or that may render them injurious to health [sec. 402(a) (4), sec. 501(a) (2), sec. 601(c)].

28. Forbids the use of uncertified coal-tar colors in food, drugs and cosmetics, other than hair dyes [sec. 402(c), sec. 501(a) (4), sec. 601(e)].

29. Proscribes slack filling of containers for food, drugs and cosmetics, and prohibits the use of deceptive containers [sec. 403(d), sec. 502(i) (1), sec. 602(d)].

30. Authorizes factory inspection of establishments producing food, drugs, devices, and cosmetics for interstate shipment [sec. 704].

31. Provides for the procurement of transportation records and other documents necessary to establish Federal jurisdiction [sec. 703].

32. Requires that part of samples collected by the Government for analysis be given to the manufacturer on request, but provides exemption from this requirement to the extent necessary for proper administration of the act [sec. 702(b)].

33. Authorizes the Government to charge fees for the certification of coal-tar colors in amounts necessary to defray the expenses of the service [sec. 706].

34. Specifically authorizes abatement of administrative proceeding in minor violations through written notice or warning from the enforcing agency when the public interest can thus be adequately served [sec. 306].

35. Provides increased criminal penalties for violations [sec. 303].

36. Authorizes the Federal courts to restrain violations by injunction [sec. 302].

37. Limits seizure for misbranding to a single interstate shipment of the product unless the misbranding has been the subject of a prior court decision in favor of the Government, or unless the misbranded article is dangerous to health, or its labeling is fraudulent or would be in a material respect misleading, to the injury or damage of the purchaser or consumer [sec. 304(a)]. Authorizes consolidation of multiple-seizure cases (seizures of two or more interstate shipments of identical goods from the same shipper) for trial in a single jurisdiction [sec. 304(b)]. Also authorizes such consolidated cases, as well as cases involving seizure of a single interstate shipment for misbranding, to be removed for trial to any district agreed upon by stipulation between the Government and the shipper or owner of the seized goods. In case of failure to reach an agreement, the shipper or owner of the goods may apply to the court in which the seizure was made, and the court is required, unless good cause to the contrary is shown, to specify a district of reasonable proximity to the applicant's principal place of business in which the case will be tried [sec. 304(a), (b)]. (The old law places no limitation on the number of shipments of illegal goods which may be seized; contains no provision for change of venue for trial; and seizures thereunder are tried in the districts in which the seizures occur, which ordinarily are the districts to which the goods have been shipped for sale and consumption.)

38. Provides for a judicial review in United States Circuit Courts of Appeals to determine the validity of certain regulations. This form of review is an addition to and not in substitution for any other remedies provided by law [sec. 701(f)].

Immediately upon approval of the act by the President, the following prohibitions therein became effective [sec. 901 (a)]:

The prohibition against drugs which are dangerous to health when used in

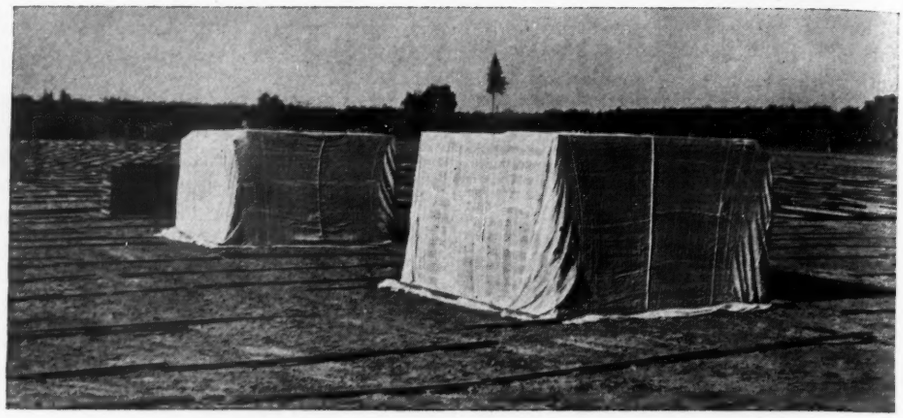
(*Turn to page 469*)

THE LONG EXPECTED REVISION of the Food and Drug Law of 1906 has finally been enacted. Here is the official digest of the new law, called the Food, Drug and Cosmetic Act, as put out by the Food and Drug Administration. It highlights the outstanding features of the new law. Interested persons should write to the Food and Drug Administration, Washington, D. C., for copies of the law itself.

Important to remember is the fact that the new act became law on June 25, 1938, but that its provisions (with certain exceptions noted) will not become effective until June 25, 1939.

The Late Senator Copeland

Throughout the long struggle of the new food legislation through Congress, the late Senator Royal S. Copeland was its principal champion. The Senator, shown here in a characteristic working pose, passed away soon after Congress enacted the new law.



Typical application of shade cloth as a protecting cover for trays of dried fruit after stacking. This is at the ranch of Pinkham Holding Co., near Exeter, Calif. The cloth keeps insects from depositing eggs on the fruit and greatly reduces infestation.

CLOTH COVER Curtails Infestation of Dried Fruit

Experiments point to simple solution of serious problem. Cost is only 25 cents per ton.

INSECT INFESTATION, one of the dried-fruit producer's most serious problems, apparently is well on the way to being solved. Heading the list among the preventable damages to dried fruit, infestation is being very greatly curtailed, almost eliminated, in experiments under way in California. And all this is accomplished at the insignificant cost of 25 cents per ton of fruit by the simple procedure of covering stacks of the trays of dried fruit with shade cloth. The cloth acts like mosquito netting, keeping the insects from getting into the sun-dried and sterilized fruit after it is stacked preliminary to boxing.

These tests in quality improvement and reduction in spoilage by the use of shade cloth are being conducted by the extension service of the College of Agriculture of the University of California, in cooperation with the Dried Fruit Association of California. The tests are being made with 20,000 linear yards of shade cloth furnished by the Agricultural Adjustment Administration. A selected group of 65 growers is cooperating in the experiments, under the direction of A. F. Jewett, of the Dried Fruit Association.

The tests are based on the premise that placing cloth over and around stacks of the trays of dried fruit will prevent insects, such as the raisin moth, from entering the stacks and depositing their eggs on the fruit. And this method has given as high as 100 per cent control, according to government entomologists.

It is a well-known fact that when the fruit is in trays on the ground the hot summer sun sterilizes it and kills any insect eggs which were deposited the night before. And it is equally known that eggs laid by insects on the fruit which is in stacks eventually hatch and cause a high percentage of infested fruit.

In the experimental tests in California, the procedure has been to compare the infestation of unprotected fruit with that in the stacks which have been covered with the shade cloth as soon as completed and allowed to remain covered until immediately before boxing. The unprotected fruit is selected, cut, sulphured and spread under exactly the same conditions as that covered with the cloth. Then samples are drawn under the direction of the local farm advisor or a representative of the Dried Fruit Association of California and are taken to the laboratory of the U.S. Bureau of Entomology and Plant Quarantine at Fresno.

Comparison of Infestation in Covered and Exposed Fruit.

	Per cent of insect infestation	
	Exposed	Under cloth
Figs	18.9	1.7
Apricots	57.4	0.0
Nectarines	100.0	7.7
Peaches	97.1	3.5
Pears	22.5	3.6

While the final results of the California tests will not be ready for months, some indication of what they will reveal can be gathered from the results of previous isolated experiments. A recent test on various fruits and raisins by a group of technologists of the U.S. Bureau of Entomology and Plant Quarantine at Fresno gave the astounding results listed in the accompanying table.

IN ADDITION to the tabulated facts, it was discovered that Thompson seedless raisins, which averaged 39,300 moth larvae per ton after 32 days' exposure in sweat boxes, were infested at the rate of only 2,300 per ton when covered with shade cloth. Similar experiments on three ranches last year revealed an average infestation of 21,700 per ton in the exposed boxes and 1,600 per ton in boxes covered with shade cloth.

Officials of the bureau say that the shade cloth also "appears to be promising" for protecting dates ripening on the palms from the attacks of both insects and birds.

The shade cloth used is cotton fabric of open weave, more open than most cheesecloth and of stronger construction. The threads are strong and the sheets are reinforced at the edges and by a gridiron of narrow, closely woven bands extending across the cloth and spaced about one foot apart. The cloth used costs about $5 a sheet (factory price) and has a life of five years. The total cost of using it is estimated at about 25 cents a ton of fruit, including labor, on the basis of current experiments.

Blanching Vegetables for FREEZING PRESERVATION

PART II

Inactivation of the enzymes in vegetables

By
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and
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THE PROBLEMS OF freezing preservation of vegetables are becoming more complex with the advance of knowledge. In 1938, with its first important carry-over of frozen vegetables from a prior pack in 1937, wholly new problems can be expected to arise. This is the first time that commercial quantities of frozen vegetables have been subjected to prolonged storage.

At the Conference on Food Preservation at The Pennsylvania State College in June, 1938, it was stated by Dr. D. K. Tressler that storage temperatures of —40 deg. F. are necessary if frozen vegetables are not properly blanched to inactivate the enzymes. Also that proper storage temperatures depend on the length of time in which the goods are to be held, and also on the adequacy of the blanching treatment. After six months in storage the goods enter a very critical period where improperly processed goods will deteriorate very rapidly.

For these reasons this summation of the status of blanching as a step in frozen food preservation becomes important not only to the food technologist and the frozen food manufacturer, but also to the buyer of frozen foods (for his storage policy must be dependent on the adequacy of treatment), to the cold storage warehouse operator and to the engineers who design warehouses as well as processing equipment.—THE EDITORS

THE nature of the enzymes responsible for the deterioration of underblanched vegetables is still not definitely known. Nor is the nature of the changes in flavor known. It was believed that respiratory enzymes were involved (Kohman and Sanborn, 1934), and this belief was strengthened by the findings of Arighi, Joslyn and Marsh (1936), that acetaldehyde—a product of anaerobic respiration—was formed as a result of enzyme activity during freezer storage of peas, and that it decreases in amount as the blanching temperature increases. Their data, summarized in Table III, shows that the catalase content is not a reliable index of quality, although it decreases as the quality of the sample becomes better. However, in order to inactivate the agencies producing off-flavor, it is necessary to scald at temperatures somewhat higher and for longer periods of time than is necessary to inactivate the catalase. There is a decrease in the amount of acetaldehyde in peas as the quality of the samples becomes better. In the last three samples, the mushiness and poor flavor are undoubtedly due to over-blanching.

Catalase and ascorbic acid oxidase have been shown by Kertesz, Dearborn and Mack (1906), to be inactivated by heat at the same rate in peas. In 1937, Tressler *et al* reported that the inactivation of catalase and peroxidase in lima beans occurred at the same rate, thus confirming biological importance of the latter (see Table IV). Recent investigations by Tressler and his collaborators showing that loss of Vitamin C occurs during blanching of vegetables and that this loss becomes greater as the blanching period is prolonged, serve as additional reasons against over-blanching. Their data for lima beans is shown in Table V.

Since the usual commercial blanching period for lima beans is 150 seconds, much Vitamin C could be conserved by reducing the period of blanching to 45 seconds for smaller sizes and to 60 or 75 seconds for the larger sizes.

The evidence obtained by several investigators indicates that for lima beans and peas, at least, the minimum blanching period necessary to inactivate the catalase content (as determined qualitatively) was adequate to inhibit the formation of off-flavors and changes in colors during freezing storage.

On the other hand, however, Smart and Brunstetter (1936), found that the catalase in Maryland grown lima beans was more resistant to heat than was found by Tressler for New York grown beans, and recommended a scalding period longer than that necessary to inactivate catalase at 212 deg. F. They found that small beans blanched for six and nine minutes at 190 deg. F. both gave products of satisfactory quality, even though at the shorter blanching period, catalase activity was still present. Similarly for spinach and kale, they found that blanching for time periods not quite long enough to destroy catalase, yielded products of fresh quality; three minutes for spinach and five minutes for kale. Their data on kale is of interest in connection with the preliminary conclusions of Diehl (1932) that some vegetables such as carrots, kale and okra, apparently do not absolutely require scalding for the preservation of color and prevention of changes in flavor. A similar trend is found in the data of Diehl and Berry on corn (1935), where complete catalase inactivation was apparently not necessary to inhibit formation of off-flavor. However, Diehl *et al* favor the use of the catalase test as a criterion only of minimum blanching time.

Our recent investigations on the scalding of vegetables were undertaken to determine the correlation between catalase inactivation and flavor retention; and to determine whether complete inactivation of the other enzymes such as peroxidase, ascorbase and phenolase (when present) was necessary. Peas, asparagus, artichoke hearts, lima beans, horse beans, string beans, squash, brussels sprouts, locally grown and of known history, were used. In one sample of Laxton Progress peas, the peroxidase (when tested qualitatively) was found to be less resistant to heat than catalase. The latter surprisingly gave a strong, positive test even after blanching for five minutes in boiling water. In asparagus, the peroxidase and catalase exhibited about the same heat resistance. In artichoke hearts, the peroxidase

was qualitatively more resistant to heat than catalase, although color retention depended upon the inactivation of phenolase. In lima beans, the peroxidase was somewhat less resistant to heat than catalase. In horse beans, on the other hand, the peroxidase was somewhat more heat resistant than catalase. In Kentucky Wonder string beans, catalase was more resistant to heat than peroxidase in one series, but not so in another. In Brussels sprouts they were about equal. In cauliflower, and in the various varieties of squash that were tested, the peroxidase was definitely more resistant to heat than the catalase.

Flavor observations made after storage at 0 deg. F. for two months, indicates that the peas blanched for two minutes at 180 deg. F., showing positive peroxidase (benzidine) and catalase reactions, were superior to those blanched at lower or higher temperatures, although those blanched for ½ minute at 212 deg. F. were also good. The latter also had a positive peroxidase and catalase test. Asparagus blanched for two minutes at 212 deg. F., which still gave a positive test for catalase and peroxidase, was better in flavor than that blanched for shorter or longer periods.

String beans blanched for two minutes at 212 deg. F., exhibiting a negative peroxidase but positive catalase test, were of better flavor and texture than those blanched for longer periods in boiling water. However, those blanched for three minutes at 190 deg. F. were of better texture and equal in flavor, although they gave a positive peroxidase test and a negative catalase test. Similar observations were made on other vegetables, indicating the difficulty of correlating the qualitative enzyme tests with keeping quality, at least over a short storage period. However, quantitative data on enzyme activity already obtained, indicates that complete inactivation of both peroxidase and catalase is obtained in samples judged to be best in flavor at least, for certain vegetables.

In the belief that a proper scalding period is a function of heat penetration and enzyme inactivation, data were obtained on the rate of temperature change in various vegetables during blanching. This was compared with data on the heat inactivation of enzymes in expressed vegetable juices. In many cases the heat penetration was quite slow. However, evidence was obtained that the enzymes, particularly peroxidase, were inactivated in the vegetable tissues at temperatures considerably lower than those at which they were inactivated in the juice. Furthermore, enzyme activity in the defrosted tissues of frozen vegetables was somewhat different from that in the tissues before freezing. Additional information on this and other points is necessary. In the meantime, we are not yet certain as to how complete a destruction of all the enzyme systems present in vegetables is necessary for flavor retention. In fruits the problem is somewhat simpler.

Until further information on the enzyme systems involved in flavor deterioration is obtained, scalding will still remain largely an empirical procedure.

Magoon and Culpepper (1924) stressed the losses of soluble food material during scalding in boiling water, and for this reason recommended scalding in steam. A number of frozen vegetable packers are using steam for this reason. And, according to G. D. Sorber, also to reduce the absorption of water by the vegetables. Our experience with steam blanching has indicated that it leads to less uniform blanching under present commercial conditions. However, this point is being investigated further.

Summary and Conclusions

1. The scalding period for vegetables should be long enough to inactivate enzymes responsible for deterioration, yet not long enough to soften the texture to such an extent that further cooking will make the vegetable too soft to be palatable, nor undesirably to alter its flavor. In vegetables, like peas, whose flavor is particularly susceptible to injury by heat, we believe that this can best be done under commercial conditions by blanching at temperatures slightly below boiling rather than by a short blanch in boiling water.

2. The qualitative test for catalase inactivation may occasionally be deceptive in determining the proper blanching period for even peas, and is not applicable to all products.

3. The peroxidase test may be used as an additional index of proper blanching in some cases.

4. Phenolase test, for vegetables and fruits that discolor, is the most definite index of adequate blanching. This is particularly true for artichokes.

Table IV—Blanching Period Required for Inactivation of Catalase and Peroxidase in Lima Beans of Various Sizes*

Sieve size, Diameter of opening, inches	Blanching time, seconds
Pass 11/11	30
11/11–1½	45
1½–5/8	45
5/8–¾	45
¾–7/8	60

* From Tressler, D. K., Mack, G. L., Jenkens, R. R., and King, C. G., "Vitamin C in Vegetables," *Food Research* 2, 175–181, 1937.

Table III—Effect of Acetaldehyde and Catalase Contents on Quality of Peas*

Temp, deg, F,	Color	Texture	Remarks	Catalase Factor	Acetaldehyde, p.p. m,
68	Olive green	Solid	Poor flavor	0.03468	26.4
104	Olive green	Solid	Worse flavor	0.03905	61.6
122	Olive green	Solid	Poor flavor	0.01877	52.8
140	Olive green	Tough	Poor flavor	0.01163	44.0
149	Olive green	Tough	Poor flavor	0.00000	35.2
154	Olive green	Tough	Poor flavor	.....	....
158	Better	Firm	Poor flavor	.....	....
163	Better	Firm	Poor flavor	.....	26.4
167	Better	Firm	Fair flavor	.....	....
171	Greener	Firm	Good flavor, slightly off	.....	....
176	Good color	Firm	Good flavor	.....	18.1
185	Good color	Firm	Good flavor	.....	....
194	Good color	Slightly mushy	Good flavor	.....	8.8
203	Good color	Mushy	Fair flavor	.....	....
212	Good color	Very mushy	Poor flavor	.....	8.8

* From Arighi, A. L., Joslyn, M. A., and Marsh, G. L., "Enzyme Activity in Frozen Vegetables," *Ind. & Eng. Chem.* 28, 595, 1936.

Table V—Effect of Blanching on Ascorbic Acid Content of Fordhook Lima Beans*

Sieve size, diameter of opening, inches	Blanching period, seconds	Catalase inactivated, per cent	Ascorbic acid content on fresh basis mg. per gm,	Ascorbic acid lost during preparation for freezing, per cent
Pass 11/11	0	0	0.46	..
	30	100	0.33	19
	45	100	0.30	23
	60	100	0.28	29
	150	100	0.24	32
½—5/8	0	0	0.43	..
	45	100	0.30	23
	60	100	0.29	27
	75	100	0.28	32
	150	100	0.23	40
¾—7/8	0	0	0.28	..
	45	92	0.20	23
	60	99+	0.19	27
	75	100	0.18	30
	150	100	0.16	35

* From Tressler, D. K., Mack, G. L., Jenkens, R. R., and King, C. G., "Vitamin C in Vegetables," *Food Research* 2, 175–181, 1937.

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Marsh, G. L., and Glenn, D. S. (1931). Preliminary report on the effect of blanching on the quality and texture of frozen vegetables. Unpublished progress report.

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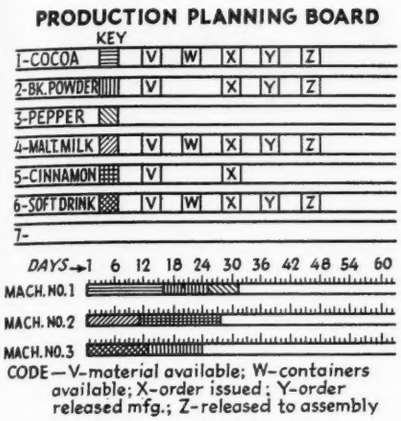
Putting EFFICIENCY into Packaging



Board which will simplify the planning of packaging production. Opposite the name of each product is a key for the product and spaces in which to indicate whether the material to be packaged is available, whether the containers are available, whether the order for packaging the product has been issued by the planning department, whether the order has been released to the manufacturing department, and whether the order has been released to the assembly or packaging department. At the bottom is listed each packaging machine, and opposite the numbers of the machines are horizontal bar charts with days marked off on them. The charts show the number of days' work ahead of each machine and are changed daily.

How to plan packaging production and make quick change-overs from one product or package to another.

By RALPH H. AUCH
Lawrenceburg, Ind.

EFFICIENCY IN PACKAGING OPERATIONS is highly important in the food industries, where profit margins per package are small. And for this reason, packaging machines designed for high capacity and good efficiency frequently find favor over a larger number of smaller, less efficient machines. But where several dissimilar products or packages must be handled on one machine there is introduced not only the problem of planning packaging production so as to minimize the changes that must be made in that machine but also the problem of adopting an efficient technic for making the necessary changes.

The fewer the changes that need be made to accommodate the packaging line to the variety that it must handle, the better, of course, from a cost standpoint. Thorough planning of production not only effects the obvious savings in time and labor required in changing the machines, but it improves that intangible, not so easily measured, production-line efficiency.

So very close coordination of and cooperation between the sales, sales-promotion, purchasing, manufacturing and packaging departments is vitally essential. In addition, a cultivated sixth sense is necessary to take into account economic conditions, seasonal changes in demand and other current factors.

Consider the case of the manufacturer of a line of food and household specialties and cosmetics embracing over 200 separate products and package sizes. To solve his planning problem, this manufacturer finally put his production on a definite cycle. Perishable items such as coffee and marshmallow crème are produced practically continuously, but all other products are produced and packaged only once in a four-week cycle, being turned out in sufficient quantity to last for 28 days' anticipated sales. This system makes what otherwise would be a complicated and uncertain planning program comparatively simple and very definite.

Such diverse products as cocoa, chocolate, malted milk, baking powder, a full line of ground spices and soft drink powders in cans have been handled on the same non-free-flowing powder packing line. Six flavors of gelatin dessert; five different prepared pudding powders, one containing rice, another tapioca; four pie fillings, one of which carries coconut shreds; two ice cream powders; and four cake icings, one with nut meats, have all been handled on the same bag-forming, contents-weighing, sealing and carton-forming and sealing machines with but minor changes and adjustments.

An even dozen dissimilar products have been successfully handled on a

(Turn to page 474)

Plant mechanic changing over a packaging machine in preparation for a run on a different package. Note tote box in which mechanic has all the tools and parts needed to make the change, and also the stand (on casters) which puts the box at a convenient working level. This arrangement saves time and avoids mistakes.

Existing Cold Storage Facilities
For Quick Frozen Foods

Part I

By IVAN C. MILLER
Distribution Editor, Food Industries

FOODS, frozen to be sold in the frozen state, must be safeguarded and controlled from the time of the initial freezing to the time of final defrosting. Frozen foods must be safeguarded against oxidation and dehydration, both in transit and in storage. The temperature must be controlled whether the products are to be preserved in the frozen state for a month or a year or more. This makes the storage warehouse a most important factor in the distribution of frozen foods.

There are seven types of cold storage warehouses in which frozen foods may be stored awaiting delivery to institution or retail outlet. Not all types are as yet in general use.

Every metropolitan area has one or more public cold storage warehouses. These are defined by the Department of Agriculture as those which cater solely to the business of *storing* perishable commodities. These are particularly suitable for warehousing large stocks over long periods, such stocks to be drawn on by distributors in smaller communities without public warehouse accommodations. Table I gives the total storage capacity of public warehouses by states and their capacity for storage at temperatures below 10 deg. F. Table II tabulates the same information for leading cities. The Department of Agriculture's report does not indicate that all of the 636 public cold storage warehouses can furnish the accommodations and the requirements for the storage of quick frozen foods. Furthermore, all the indicated 70,953,410 cu.ft of warehouse capacity held at temperatures of 10 deg. F. or below, may not be suitable for quick-frozen food storage.

All frozen foods need not be held at the low temperatures required for the proper preservation of quick frozen foods.

How profitable the storage of quick frozen foods will prove to the individual public cold storage warehouse will depend on the insulation of the low temperature rooms, the refrigerating equipment, the length of the storage period, and the frequency of withdrawals.

Private cold storage plants are already an important factor in frozen food warehousing. These, when used for storage of frozen foods are, however, largely for the storage of the manufacturer's stock. Under this class of cold storage warehouses, according to the Department of Agriculture's definition, are the warehouses of the fisheries. The number of fishery cold storage warehouses is small compared to the total. Few of the remaining warehouses in this class are suitable for quick-frozen food storage. Private cold storage warehouses consist largely of those of produce dealers, and operators in dairy products—butter, eggs and poultry. In this group are many warehouses used for the storage of apples. Each of these cold storage warehouses is used mainly for the storage of a single product, therefore designed and equipped accordingly. Few of these plants are at present of any consequence in the distribution of quick frozen foods. Few, aside from those of the fisheries, maintain temperatures low enough for the proper storage of quick frozen foods. Table III provides statistics on private

Table I—Refrigerated Space: Public Cold Storage Plants
Oct. 1, 1937

State	Concerns	Space held at Temperatures of 10° F. and below	Total Space
	Number	*Cubic Feet*	*Cubic Feet*
Alabama	5	488,800	1,653,160
Alaska	5	1,032,344	1,230,290
Arkansas	8	70,922	1,150,161
California	49	2,924,785	19,769,007
Colorado	7	474,658	1,354,053
Delaware	4	106,751	822,672
Florida	19	418,494	2,468,694
Georgia	33	500,609	3,133,722
Idaho	8	139,366	966,863
Illinois	31	10,650,264	34,202,679
Indiana	13	850,387	4,278,261
Iowa	9	877,209	1,814,389
Kansas	14	1,251,698	5,183,042
Kentucky	6	403,219	2,450,114
Louisiana	5	552,450	2,138,644
Maryland	4	744,079	2,626,858
Massachusetts	11	4,681,702	9,756,548
Michigan	11	2,346,211	10,259,039
Minnesota	9	1,914,949	4,824,986
Missouri	22	6,050,704	17,285,186
Nebraska	4	576,932	1,278,363
New Jersey	17	3,652,419	21,566,868
New York	105	12,424,641	64,218,713
North Carolina	7	52,939	406,965
Ohio	18	3,541,558	14,988,011
Oklahoma	7	298,935	1,663,710
Oregon	16	1,463,751	6,676,034
Pennsylvania	39	3,829,609	25,931,293
Tennessee	8	869,832	3,727,494
Texas	25	1,493,443	7,500,901
Virginia	24	853,570	18,400,836
Washington	60	3,081,154	26,795,854
West Virginia	5	5,290	1,773,290
Wisconsin	11	1,001,742	5,180,849
All other States	17	1,327,994	6,356,041
Total	636	70,953,410	333,833,590

Table II—Refrigerated Space: Leading Cities, Public Cold Storages
Oct. 1, 1937

City	Concerns	Space held at Temperatures of 10° F. and below	Total Space
	Number	*Cubic Feet*	*Cubic Feet*
Buffalo, N. Y.	3	1,994,158	4,387,111
Chicago, Ill.	14	10,449,202	31,403,039
Cincinnati, Ohio	3	490,033	1,997,865
Cleveland, Ohio	5	2,528,425	8,571,650
Dallas and Fort Worth, Texas	11	890,841	3,356,274
Detroit, Mich.	7	2,046,859	9,007,880
Kansas City, Kansas and Missouri	3	3,116,418	5,489,559
Los Angeles, Calif.	6	1,073,915	4,935,485
Milwaukee, Wis.	4	877,860	2,281,235
Minneapolis and St. Paul, Minn.	7	1,624,133	3,203,949
Greater New York	29	9,645,693	40,797,229
Philadelphia, Pa.	8	2,158,154	9,797,757
Portland, Oregon	10	1,328,079	4,964,065
Pittsburgh, Pa.	6	1,064,282	5,985,958
St. Louis, Mo. and E. St. Louis, Ill.	7	2,861,679	8,930,879
Seattle, Wash.	7	2,301,095	4,850,527
Total	130	44,450,826	149,960,462

cold storage warehouses by states.

A third classification of cold storage warehouses is the combined public and private warehouse. This type is owned and operated privately by individuals or firms who deal in some commodity requiring refrigeration: that is, fruit, eggs, poultry, fish, etc. They do some incidental public warehousing. A few of these warehouses, principally those of the fisheries, engage in manufacturing frozen foods. Not many of the remainder offer facilities satisfactory for the storage of quick frozen foods as they move along the channels of distribution. Statistics appear in Table IV.

Only about 7 per cent of the total capacity of the meat packing companies' cold storage warehouses is held at temperatures of 10 deg. F. and below, and of the 309 meat packers' warehouses not over 5 per cent do public warehousing. These warehouses are important for the storage of the manufacturers' own frozen products, whether these products are ultimately sold fresh or frozen; but these warehouses are at present of little moment as storage plants for quick frozen foods en route to the consumer. Statistics appear in Tables V, VI and VII.

Included in the tables of all cold storage warehouses is the group of warehouses which operate but seasonally. Although these plants may some

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Table III—Refrigerated Space: Private Cold Storage
Oct. 1, 1937

State	Concerns	Space held at Temperatures of 10° F. and below	Total Space
	Number	*Cubic Feet*	*Cubic Feet*
California	7	88,144	1,773,962
Colorado	4	3,000	60,935
Connecticut	3	.....	288,000
Illinois	7	1,329,791	3,749,964
Iowa	6	161,798	423,501
Kansas	4	30,065	652,902
Maine	4	378,300	378,300
Massachusetts	15	848,427	1,704,258
Michigan	10	19,000	326,233
Mississippi	3	15,735	96,920
Nebraska	10	166,326	519,057
New Jersey	6	8,372	598,270
New York	42	282,131	1,974,769
Ohio	17	170,898	849,404
Oregon	7	109,550	3,065,895
Pennsylvania	14	429,170	1,660,207
Tennessee	5	574,314	700,431
Texas	8	.....	403,400
Washington	28	230,963	10,430,342
Wisconsin	16	.....	954,470
All other States	21	504,845	3,279,222
Total	237	5,350,829	33,890,442

Table IV—Refrigerated Space: Combined Public and Private Cold Storages
Oct. 1, 1937

State	Concerns	Space held at Temperatures of 10° F. and below	Total Space
	Number	*Cubic Feet*	*Cubic Feet*
Connecticut	3	168,781	654,901
Illinois	4	1,686,756	11,522,616
Indiana	4	250,573	757,271
Iowa	5	457,676	1,029,278
Kansas	3	516,069	1,480,099
Massachusetts	5	128,534	904,863
Michigan	9	591,581	1,649,096
Minnesota	3	173,980	308,376
Missouri	4	.....	583,600
Nebraska	3	1,111,450	2,585,463
New Jersey	5	522,600	949,576
New York	30	426,070	4,539,334
North Carolina	3	10,790	164,559
Ohio	4	292,607	897,663
Oregon	7	53,314	1,490,356
Pennsylvania	3	18,790	361,346
Washington	47	194,770	16,821,159
West Virginia	3	83,400	1,335,488
Wisconsin	15	111,558	1,720,020
All other States	18	195,417	3,201,669
Total	178	6,994,716	52,956,733

Table V—Refrigerated Space: Meat Packing Establishments
Oct. 1, 1937

State	Concerns	Space held at Temperatures of 10° F. and below	Total Space
	Number	*Cubic Feet*	*Cubic Feet*
California	19	450,912	6,396,746
Colorado	5	768,332	5,251,595
Idaho	5	22,464	156,215
Illinois	26	3,594,323	57,495,856
Indiana	18	849,695	13,124,030
Iowa	12	2,420,128	26,407,877
Kansas	8	1,143,717	22,958,931
Kentucky	6	8,464	1,641,545
Maryland	6	59,810	2,204,347
Massachusetts	6	847,459	7,852,646
Michigan	5	208,163	3,956,307
Minnesota	9	2,271,263	21,707,671
Missouri	17	1,088,262	15,569,345
Nebraska	4	1,538,460	18,213,654
New Jersey	6	23,040	2,165,359
New York	33	248,287	10,199,356
Ohio	26	277,826	8,349,469
Pennsylvania	30	271,296	7,051,699
Tennessee	5	74,387	5,806,471
Texas	9	899,791	10,122,522
Washington	9	293,774	3,996,732
West Virginia	3	.....	536,151
Wisconsin	8	999,035	8,959,852
All other States	34	1,412,483	18,166,097
Total	309	19,771,371	278,290,563

Table VI—Refrigerated Space: Leading Cities, Meat Packing Establishments
Oct. 1, 1937

City	Concerns	Space held at Temperatures of 10° F. and below	Total Space
	Number	*Cubic Feet*	*Cubic Feet*
Baltimore, Md.	6	59,810	2,204,347
Boston, Mass.	3	827,337	7,248,746
Buffalo, N. Y.	5	12,380	1,988,630
Chicago, Ill.	16	2,717,939	48,932,710
Cincinnati, Ohio	5	8,968	1,110,690
Cleveland, Ohio	6	115,358	3,365,356
Louisville, Ky.	3	6,864	1,446,383
Greater New York	18	104,726	5,902,801
Pittsburgh, Pa.	4	1,940	1,496,235
Philadelphia, Pa.	8	238,780	2,632,046
St. Louis, Mo., and E. St. Louis, Ill.	10	623,353	6,999,482
Total	84	4,717,455	83,327,426

Table VII—Refrigerated Space: Meat Packing Establishments Doing a Public Cold Storage Business
Oct. 1, 1937

State	Concerns	Space held at Temperatures of 10° F. and below	Total Space
	Number	*Cubic Feet*	*Cubic Feet*
Kansas	3	843,681	8,660,631
All other States	11	3,350,385	22,690,053
Total	14	4,194,066	31,350,684

Table VIII—Total Refrigerated Space as of Oct. 1, 1937
Summary by Class of Business

Class of Business	Warehouses	Space held at Temperatures of 10° F. and below	Total Space
	Number	*Cubic Feet*	*Cubic Feet*
Public cold storage	636	70,953,410	333,833,590
Private cold storage	237	5,350,829	33,890,442
Combined public and private cold storages	178	6,994,716	52,956,733
Meat-packing establishments	309	19,771,371	278,290,563
Packing establishments doing a public cold-storage business	14	4,194,066	31,350,684
Total	1,374	107,264,392	730,322,012

Merchandising
HINTS AND HURDLES

Questions and Answers

CLARENCE FRANCIS, president of General Foods Corporation, in an address before the National Association of Retail Grocers, during their convention in June, answered fourteen questions submitted by members of the retailers association. These questions cover many often misunderstood or misinterpreted practices of food manufacturers. The questions indicate grievances of many independent retailers against manufacturers. The answers indicate the thinking of at least some food manufacturers regarding these grievances. Following are some of the questions and extracts from the answers:

Q. Why do manufacturers continue the use of free deals, 1-cent deals, free goods, coupons and premiums?

A. Manufacturers continue to use free deals, 1-cent sales, free goods and premiums because they can be used to sustain a list price when a temporary decline is called for, because they provide a means of sampling. Deals are used for immediate business in an attempt to retain employment, or to speed up the change of consumer buying habits. Free deals and premiums are used because of competition, because of lack of promotion on the part of wholesale and retail distributors, and to meet private brand competition. The basic reason for these merchandising devices is this: The public likes them, and so long as the public responds to them, they will be used. When free deals and premiums stop paying their way, they will be dropped.

Q. Why do manufacturers continue selling food and grocery items to other than food outlets?

A. Many grocery stores have reached outside the old field of grocery products to carry electric light bulbs, floor oils, floor wax, beer, hardware and other products previously distributed only through other types of outlets. The reason you (retailers) are now stocking many non-food items is the public's demand for the convenience of being able to buy these products in your stores. The reason why some non-grocery outlets are now handling food products is the same. The manufacturer has little control over it.

Q. Are chain store accounts as profitable to manufacturers as individual wholesalers or individual retailers when they sell direct to retailers?

A. The only possible answer to this question is: It depends. It depends on the customer. What a customer does to help move merchandise largely determines how profitable he is to the manufacturer—not the type of business he operates. Some individual retailers are more important in this respect to a manufacturer than some wholesalers or some chains.

Q. What position will AGMA take on proposed Federal chain store tax legislation?

A. I do not know what position AGMA as an organization will take. I am expressing only a personal opinion. That opinion is that any such questions should be decided primarily on the basis of the interests of consumers. We already have too much of a tendency in this country to write class legislation. I doubt the wisdom of any law whose primary purpose is to put somebody out of business unless it can be proved to be definitely in the interests of consumers to do so.

Q. Why do some manufacturers print the resale price on a package—the resale price of which is so low as to prohibit reasonable profit, and why do some manufacturers advertise in newspapers giving resale prices that do not show the retailer a fair margin?

A. In the first place, let's recognize that there is plenty of room for honest difference of opinion as to what a "reasonable profit" or a "fair margin" is. So long as the operating costs of retail groceries are from 8 per cent or 9 per cent to 28 per cent or 30 per cent, it is doubtful whether all the retailers ever will agree as to what a "fair margin" is. If you don't believe that, just go back to the minutes of your own convention meeting held at Atlantic City in 1933, when mark-up provisions under the proposed retail code were being considered, and see whether at that time you grocers were able to agree on what a "fair margin" is. As long as the operating costs of the wholesalers vary from a low of 3 per cent or 4 per cent to a high of 17 per cent or 18 per cent, it is likewise doubtful whether all jobbers will ever agree on what "a fair margin" is.

Q. Are manufacturers generally willing to come under fair trade contracts?

A. Originally the fair trade acts were intended to legislate profits for retailers and wholesalers sufficiently high so that everybody would be happy. Most manufacturers are opposed in principle to this sort of legislation. Efforts to regulate prices for the purposes of guaranteeing a profit have been made ever since there was any commerce. The end of the record in each case, so far as I can find, has been failure. Furthermore, most manufacturers are opposed to this kind of price-setting, because they are not willing to put themselves at a competitive disadvantage. We are in favor of any effort to stop loss leader selling. We are definitely in favor of laws which would prohibit anybody from selling anything below its cost. While the fair trade acts were never intended originally to meet this problem, nevertheless, it is possible to use them for that purpose by setting minimum prices that are enough above cost to give some compensation for handling. The purpose being merely to prevent loss leader selling and not to provide or establish net profits.

Q. Are manufacturers generally in favor of loss leader prohibition by legislation?

A. Loss leaders which are priced at or below a retailer's cost should be banished. A word of warning should be spoken concerning the tendency to include in such laws a fixed mark-up, either for wholesalers or for retailers. The very fact that such a minimum is specified by law may increase the tendency for these minimum mark-ups to become prevailing and maximum mark-ups. To the extent that this happens it will force down the level of average retail prices and thus reduce, rather than increase, the total of retail profits.

Sam's Store is in the front of his residence. The family lives behind and above the store.

SALES STIMULATION in a Neighborhood Store

Upper Photo: Sam's Store is a neighborhood store. This is a view from Sam's Market looking toward the General Electric plant.

Lower Photo: Sam's Market is in the neighborhood of General Electric's Bridgeport plant. Most of Sam's customers are General Electric employees.

THE RESULTS of most of the tests made by FOOD INDUSTRIES on point-of-sale display posters which have thus far been reported, were obtained in independent stores catering to the better class of trade. Several reports covered tests made with chains and voluntary groups, one reported the results in a super-market. This report covers results obtained with posters made from reprints of the women's magazine food pages in a small neighborhood family store.

The store in which the tests were conducted is located in Bridgeport, Conn., about a half mile from the General Electric plant. Sam's Market, owned by Sam Masuk, draws most of its customers from the General Electric employees who live in the neighborhood. During the past year, many of these families have either been on relief or on reduced income.

Paul, Sam's son, makes deliveries and helps in the store, as does Sam's daughter. Mrs. Masuk pinch-hits when a rush is on. Sam's Market is in the front of Sam's home. The family lives behind and above the store.

Although Sam's Market is a service store, offering credit and delivery service, much of the business is cash and carry. Portions of the store permit self-service.

This store was selected as a typical neighborhood store in which to test the point-of-sale influence of posters made from women's magazine food pages.

During the several weeks before Thanksgiving, Sam's Market recorded the sales of approximately ½ case of prepared mince-meat. Other than displaying a few packages of mince-meat in the window, no promotion was put behind mince-meat. One week before Christmas, the poster shown on page 444, showing an illustration of a mince pie, was placed in the window. Supporting the poster was a mass display of packaged mince-meat—4½ cases, all the stock on hand in Sam's Market (three cases of Crosse & Blackwell mince-meat had been purchased especially for this holiday promotion).

All mince-meat sales were made from the stock in the window. Sales slackened only as the display was depleted, until but five packages remained on display. Mince-meat sales during this one week were approximately

(*Turn to page 444*)

WOMAN'S HOME COMPANION *September food pages.*

LADIES' HOME JOURNAL *September food pages.*

A DESCRIPTION OF THE CONTENTS of the feature food pages of the forthcoming September issues of prominent women's magazines is furnished as a guide to manufacturers, the sale of whose product may be stimulated by using a store display built about reprints of one or more of these pages mounted to make posters.

GOOD HOUSEKEEPING: Full-color spread featuring pies, suitable for promoting the sale of flour, cornstarch, shortening and lemons.

McCALL'S: Full-color spread suitable for the promotion of canned corn beef hash, frozen or canned spinach and whole kernel corn.

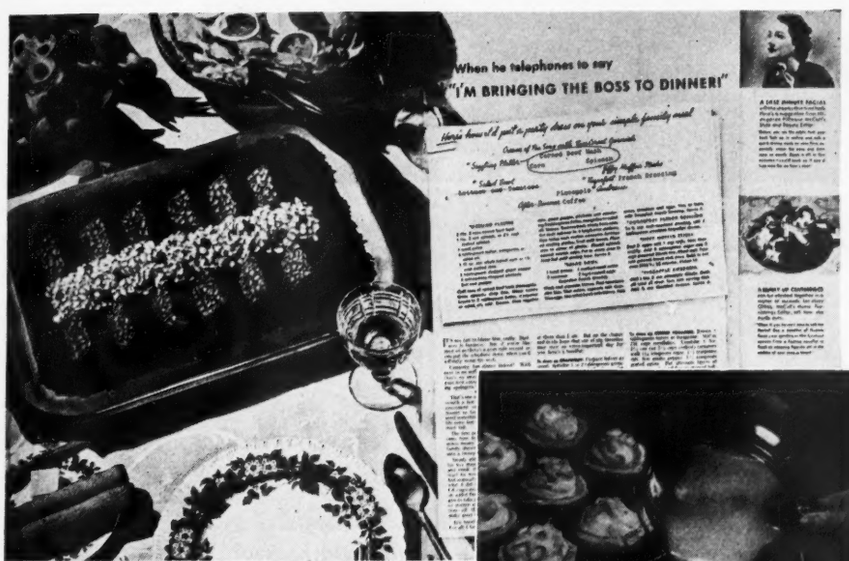
LADIES' HOME JOURNAL: Full-color spread features four dishes—suitable for promoting fresh or frozen chicken, canned or frozen shrimp, canned salmon and roast of beef.

WOMAN'S HOME COMPANION: Full-color spread devoted to recipes for making waffles—suitable for promoting waffle-making ingredients or prepared waffle mix.

PICTORIAL REVIEW-DELINEATOR: Two-color spread suitable for the promotion of canned ham, broccoli, onions, sweet potatoes, baked apples, mince meat, biscuit flour, sausage, shrimp and mushrooms.

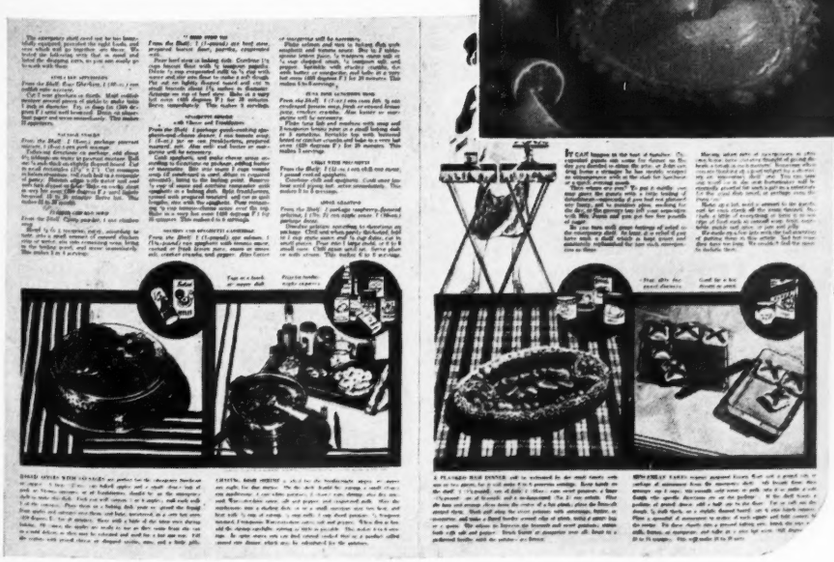
D PAGES BOOST SALES

The September women's magazine food pages, advance proofs of which are shown here, can profitably be used as posters at the point of sale by manufacturers whose products are illustrated.



September food pages from McCALL'S.

GOOD HOUSEKEEPING'S *food feature pages for September.*



PICTORIAL REVIEW-DELINEATOR *food pages for September.*

eight times as great as during a two-week period preceding Thanksgiving. Mince-meat is a seasonal item, popular, however, both at Thanksgiving and Christmas. Even though mince-meat may be more popular at Christmas than Thanksgiving, it is not probable that the popularity is in the ratio of 8 to 1. Sam's Market reported this year's sales of mince-meat well above last year.

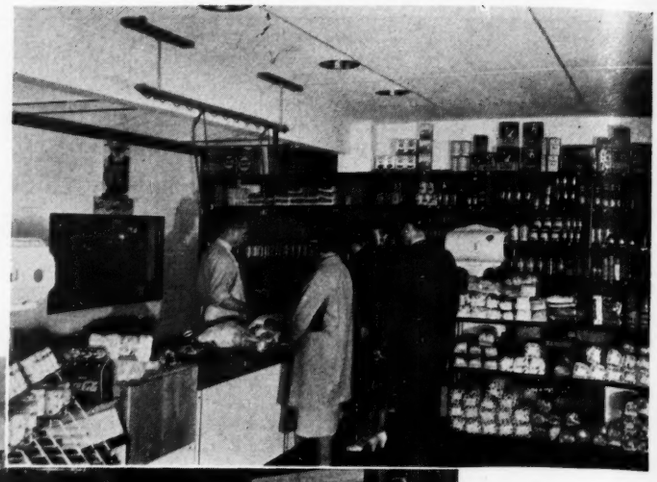
FOOD INDUSTRIES' tests, using the food pages of the women's magazines as posters for stimulating the sales of the product illustrated, have proved that these food pages used at the point of sale result in large sales increases for the products displayed.

As a result of these tests FOOD INDUSTRIES has arranged with the women's magazines to obtain advance proofs of their pages. The purpose of obtaining these advance proofs is to describe and illustrate the forthcoming food pages of the women's magazines, so that the manufacturers whose products or product are among those featured may obtain ready-for-use posters bearing reprints of the food pages and place them in the hands of retailers at or about the same time the magazines reach their readers.

Mounted reprints of these food pages (single pages on 14x22 in. poster board, spreads on 28x22 in. poster board) may be obtained from the magazine ready for use at the following prices:

SINGLE PAGE

1,000 to 1,999 inclusive each.....15c.
2,000 to 2,999 inclusive each.....12c.
3,000 and over each.....10c.



The floor area of Sam's Market is small, but Sam has a good meat department, which accounts for much of the traffic that comes to his store.

Sam's Market has windows along its longest side. The green-goods are kept in the window.

Counters have been removed in Sam's store to permit self-service of packaged merchandise.

This poster featuring in the foreground a mince-meat pie, was displayed in Sam's store the week before Christmas supported by mass display of 4½ cases of mince-meat.

TWO-PAGE SPREAD

1,000 to 1,999 inclusive each.....25c.
2,000 to 2,999 inclusive each.....18c.
3,000 and over each.....16c.

Manufacturers may either correspond with any one of the magazines direct, if interested in food pages appropriate for their products or write to the distribution editor of FOOD INDUSTRIES.

Each poster will carry the printed line "As seen in the September issue of ..... magazine." The manufacturer's own selection of caption or "selling slug" such as "Try these recipes suggested by Pictorial Review-Delineator," "Good spices make good pickles," etc., will be printed at the top of the poster. No poster will bear the name of the manufacturer or his trade brand.

Proven Practices In TRUCK LUBRICATION

Also more about painting motor vehicles

LUBRICATION expense is a factor in the cost of operating trucks and commercial cars which may vary widely, depending upon the particular practices followed by the fleet operator. In the following letters, executives who have charge of fleets in the food field outline the practices which they follow. Appearing also on this page are two discussions of painting problems, these being a continuation of a symposium carried last month.

Medium-Price Oil Used

One thousand miles is the operating interval at which we change the oil in the crankcases of our trucks and commercial cars. Our motor vehicles have not in the past been equipped with oil filters, but we are using one filter now on an experimental base.

A medium-price oil has proved satisfactory for lubricating our motor equipment, and we use S.A.E. 30 in summer and 20 in winter in our light trucks and commercial cars. The oil drained from our engines is not reclaimed.

Every two weeks the chassis of our equipment is greased. The front-wheel bearings are repacked at the same time the chassis is lubricated. and grease in the transmission and differential is changed twice a year. A heavy grade of transmission and differential grease is used in summer and a light one in winter.—C. O. EWING, *Oscar Ewing & Sons, Louisville, Ky.*

Oil Drained at 1,500 Miles

Before the oil in the engines of our trucks and commercial cars is changed it is used for 1,500 to 2,000 miles, and our vehicles are not equipped with oil filters. We have found it satisfactory to use a medium-price (25-cent) oil, the S.A.E. number being 30 for summer service and 20 for winter in our light trucks and commercial cars. We do not reclaim by clarifying the lubricant drained from the crankcase.

The period for greasing the chassis is the same as that for changing the oil—every 1,500 to 2,000 miles. Front-wheel bearings are repacked every 5,000 miles, and the transmission and differential grease is changed seasonally. A heavy grade of transmission and differential grease is used in summer and a light one in winter.

We have our trucks inspected once a week, regardless of mileage, to make sure they are properly lubricated. This inspection also covers tire inflation (this, by the way, has added very materially to our tire mileage), battery inspection and a general check-up on the condition of the truck.—L. O. HASKINS, *vice-president, Hampton Cracker Division of Consolidated Biscuit Co., Inc., Louisville, Ky.*

Dark Green Good Color

Dark green will resist fading and dulling more effectively than other colors, and it is the easiest to keep looking clean. Light colors are the most difficult to keep clean. Furthermore,, dark green is effective in minimizing the appearance of large size in large trucks and trailers.

We do not believe that the advertising value of flashy colors on motor vehicles justify their use, even though they are not as durable as other colors. But we feel that it is important to use on truck bodies a paint which is effective in reflecting heat.

In regard to the relative durability of paint, lacquer and enamel, paint is the best. And we believe it is economical to protect the finish with a coating of wax, this being applied about twice a year.

Our motor vehicles are repainted every three years, as necessary. Some of the minor disfigurations are retouched immediately, with a spray gun. We do not find it economical to operate our own paint shop, but have this work done outside.—P. Z. TURNER, *Libby, McNeill & Libby, Chicago, Ill.*

Own Paint Shop Pays

Our equipment for years has been painted in white and green. Of these two colors, we find green the easier to keep looking clean. But white tends to minimize the appearance of large size in trucks and trailers.

We question the value of "flashy" colors. But it is definitely important to use on refrigerated trucks a paint which is effective in reflecting heat from the body.

Our experience indicates that of paint, lacquer and enamel, paint is the most durable. And we do not believe it is economical to use a protective coat of wax over the finish of truck bodies.

We repaint all of our motor vehicles annually—oftener if necessary. Minor disfigurations are retouched immediately with a spray gun. It is decidedly economical to operate our own paint shop.—M. W. MICHIE, *transportation Manager, Geo. A. Hormel & Co., Austin, Minn.*

FRUITS *One Way...* DAIRY PRODUCTS *the Other*

Load both ways cuts trucking costs of hauler who pays $3,122 a year for fees on 1,100 mile run

OPERATION with no empty mileage is the key to the success of the 1,100-mile (one way) run of the tractor-trailer combination illustrated on this page. It makes five round trips a month between Tampa, Fla., and Cincinnati, Ohio. On its northward trips it carries citrus fruits of several varieties and in the opposite direction, margarine, cheese, eggs and dressed poultry. The one-way run takes from 42 to 44 hours. This gives an average road speed of between 25 and 29 miles per hour.

This tractor and insulated trailer makes five round trips a month between Tampa, Fla., and Cincinnati, Ohio, a road distance of 1,100 miles. Northbound it carries citrus fruits and southbound, margarine, cheese, eggs and dressed poultry. Dry ice is used as the refrigerant, and the run is made in from 42 to 44 hours, which is much quicker than by rail.

The equipment is owned by H. W. Juett of Marietta, Ga., who hauls on a contract basis for certain Florida fruit growers and for the Churngold Corp. and the Cudahy Packing Co. out of Cincinnati, Ohio. The combination is made up of a cab-over-engine Autocar tractor and an 18-ft. Fruehauf trailer.

The cab-over-engine type of tractor was selected because of its short wheelbase, in this case 84 in., in order to keep the overall length of the unit within the limits of the states whose roads it uses. The tractor carries a 35-gal. auxiliary gasoline tank on the right runningboard to reduce the number of gasoline stops. The tractor is also fitted with a Timken two-speed rear axle to increase the number of possible gear ratios to meet the varying grade or hill conditions.

Aside from the length of the haul, the two-way transportation of food products and the equipment itself, the operation is featured by the expenditure of $3,122 for taxes and license

Like ornaments on a Christmas tree are the license plates and license certificates of the tractor-trailer unit running between Tampa, Fla., and Cincinnati, Ohio. Altogether, eight plates are visible. Four state lines are crossed. The various license fees, mileage taxes and commission fees, together with gasoline taxes, cost the operator $3,122 in 1937.

fees during 1937. This expense, of course, had to be included in the total cost of operation used to determine the unit rate charged for the commodities handled. And, in turn, these same taxes were included in the sale prices of the foods to the final consumer.

The total of $3,122 was made up as shown in the accompanying table.

With a first cost of the unit of approximately $6,000, yearly taxes of over half that amount seem extremely high. However, four state lines are crossed, and roads are still built mainly with state funds, with some federal aid.

Fees Paid by Long-haul Truck Operator

Florida state license	$312
Florida mileage tax	696
Florida Railroad Commission	1
Georgia state license	6
Georgia Public Service Commission	25
Georgia maintenance tax	224
Tennessee state license	50
Tennessee permit	1
Tennessee Railroad Commission	25
Tennessee mileage tax	99
Kentucky permit	20
Kentucky mileage tax	612
Federal I.C.C. permit	1
Federal and state gasoline taxes	1,050
Total	$3,122

Based on the formula that those who use the roads should pay for them, this long-distance trucker is contributing to the highway funds of four states.

The greater the need, the larger the tax that can be justified. When such taxes are applied impartially, the long-distance truckman's complaint is not against the road tax itself but against its use for anything else except highway construction, maintenance and repair.

Aluminum Body Carries More Meat

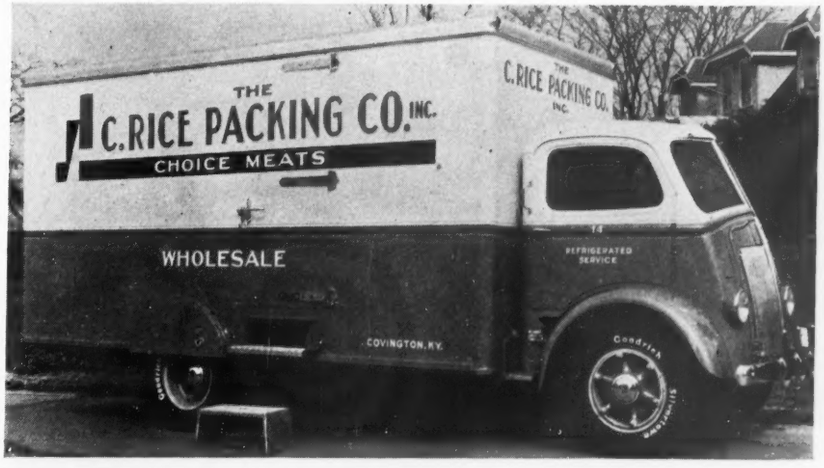
Saves 22 trips a year

INCREASE IN TRUCK PAYLOAD through the use of aluminum as a body material is effectively accomplished in the truck owned by the C. Rice Packing Co., Inc., Covington, Ky. This vehicle is used to transport whole carcasses of fresh meats, and the body is unusual in that the load is not carried on the floor but is entirely supported from the roof. This requires a special roof construction along with heavier side members to support the roof-hung load.

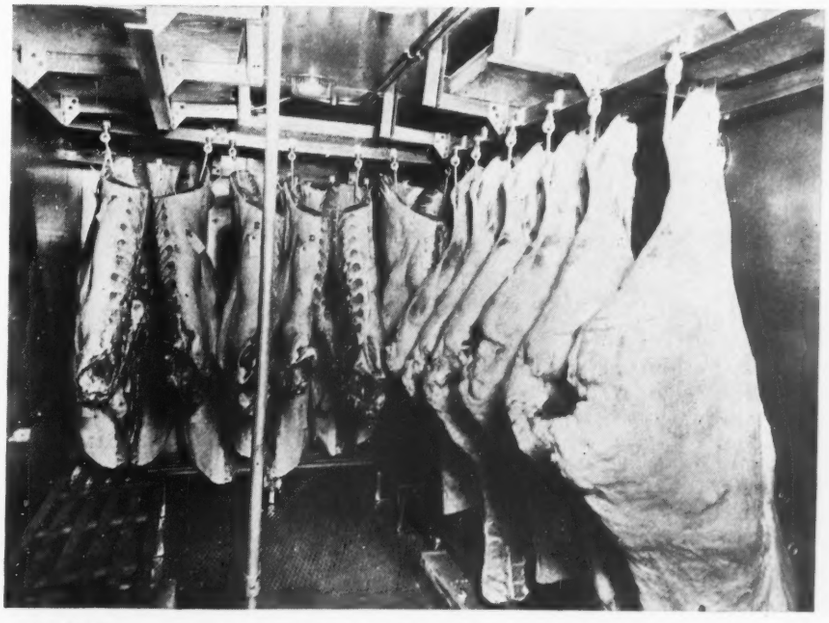
As shown in the interior view, all structural members are made of aluminum angles and sheets. The complete body weighs 1,324 lb. less than a similar body of the same size made of wood and steel. This reduction in body weight is equivalent to a payload increase of 142,400 lb., or 22 extra trips at full capacity over a period of one year.

The body is of the refrigerated type, with integral refrigerating units operated by small motors receiving their current from an electric generator driven by the truck's gasoline engine. These units may be hooked up to any regular 220-volt circuit when stops or layovers are necessary.

The truck is used for the wholesale distribution of meat from the packing house to retail butchers. At the plant it is loaded through the rear door. At the retail store, it may be unloaded from the side direct to the sidewalk. A special hinged, or pivoted, folding step is provided in the body skirt directly below the side door. A portable wooden footstool, carried inside the body, is used to provide a second easy step to the ground with the heavy pieces of meat.

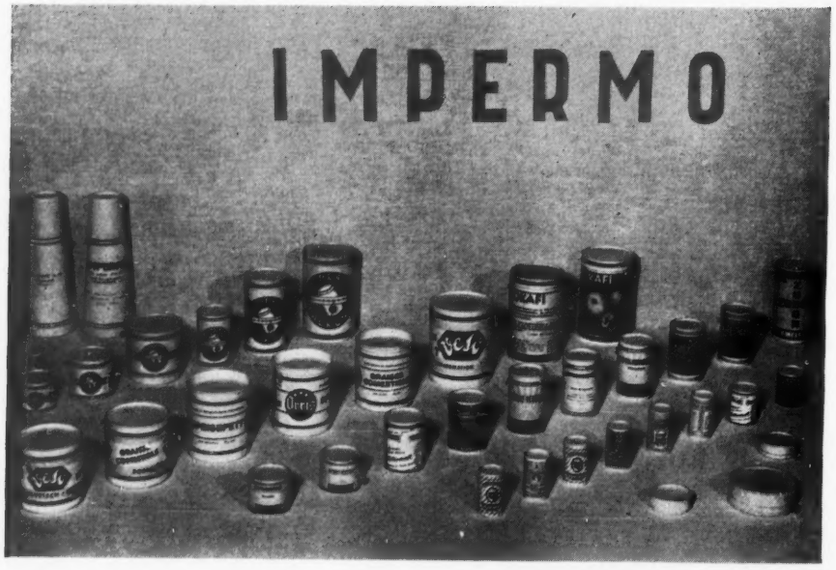


The aluminum wholesale meat body shown above weighs 1,324 lb. less than a similar body of the same size made of wood and steel. This is equivalent to 142,400 lb., or 22 extra trips, in a year.



The body is unusual in that the entire load is supported from the roof, which is made up of aluminum angles and sheets. Hooks for the meat carcasses are supported from a rail along the body sides and ends.

New PACKAGES AND PRODUCTS

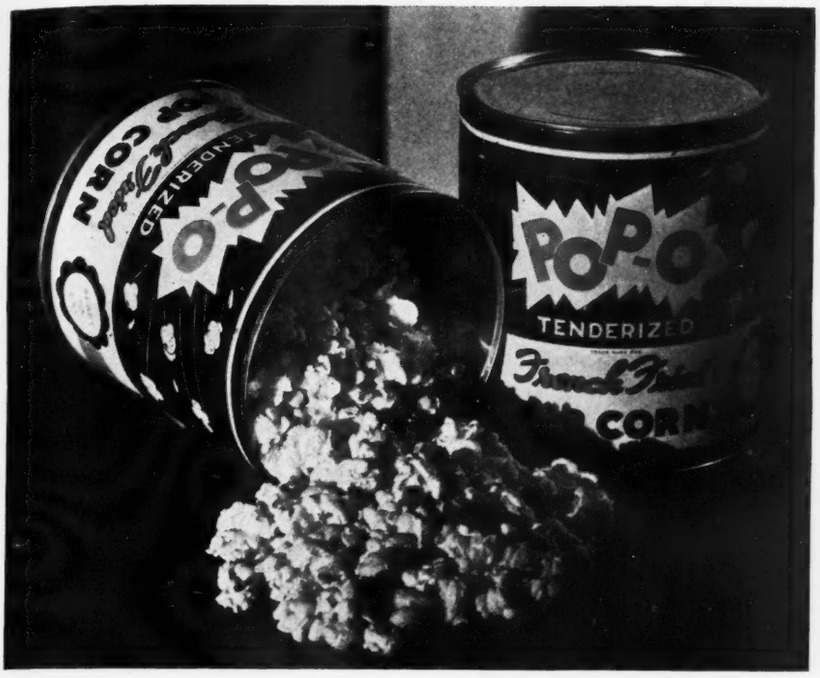


"Zipper" Opened Food Packages

TO THIS COUNTRY, from Switzerland, comes a container which may have application to the packaging of several classes of food products made here. The container, in any size, is made of heavy, stiff wax paper. The reinforcing bead at the top is turned in. Over the filled container is placed a lid which runs the full length of the container and carries the brand name and other printed material. This full length slip-over or cover is made of the same waxed paper, each sheet making two circumferences waxed together and lapping. Circling the cover near the top is stitching to the end of which is fastened a quarter inch metal button. This stitching serves as a "rip cord." When pulled it releases the portion of the cover above the stitching. The container is opened by removing this portion above the "rip cord," and tightly sealed by replacing it. When the outer full length cover is pushed completely down over the inner, this cover forms an air-tight package. The outer cover cannot be removed except by pulling the "rip cord" which releases the top only. In Switzerland, this type container is used for packaging powdered foods which must be kept dry; milk powders, malted beverage bases, cocoa, and similar items, and tea, coffee, vegetable extract, cheese and shortening.

French Fried Popcorn Canapes

THE WAVE OF POPULAR ACCEPTANCE for all canapes and tidbits has been capitalized by Pop-O Products Inc., Chicago, whose product, "Pop-O French Fried Popcorn" has recently been introduced not only as a munch-



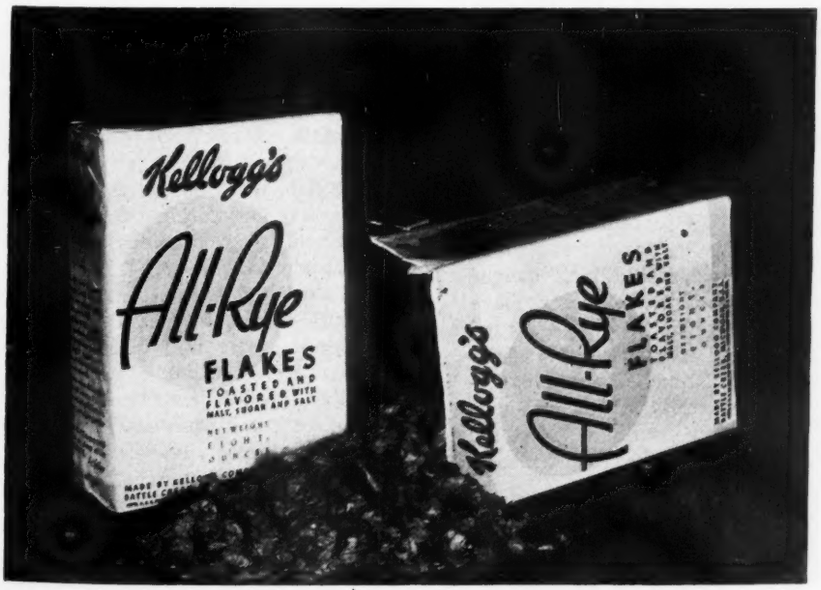
ing snack between drinks at the cocktail bar or between rubbers at the bridge table, but as a breakfast food, as an ingredient in popcorn salads, as a stuffing for poultry, as an ingredient in frozen desserts, and as croutons to be added to soups and boullions. Recipes and suggested uses appear on the label of Pop-O French Fried Popcorn, which is packed 5 oz. in No. 10 vacuum packed cans.

Cereal from Rye

JUST INTRODUCED on the West Coast is a new product of Kellogg's, Battle Creek, Mich., "All-Rye Flakes," a breakfast cereal made entirely of rye, toasted and flavored with malt sugar and salt. Publicity from the company's home economics department suggests All-Rye Flakes as an ingredient in All-Rye nut bread, date All-Rye muffins, and All-Rye Flakes meat loaf.

Canapes for the Masses

REPEAL OF THE 18TH AMENDMENT not only legalized beer, wine and liquor, but gave birth to many new food products and even many new food industries. Canapes, tidbits and hors d'oeuvres have replaced the "free lunches" in cocktail lounge and bar. Because of consumer acceptance, they have become popular shelf items, not only in the exclusive specialty shop, but in most every food store, big and little, throughout the land. Soon after its appearance on the market, FOOD INDUSTRIES, May, 1937 described Filler's corn-chips, product of Tosto Foods, Inc., Cincinnati. The product at that time was packed in 1 lb. and ½ lb. lithographed, slip-cover cans, and sold largely through "quality outlets." in better class neighborhoods. For the mass market, the product was packed in 6-oz. double-walled wax paper bags (FOOD INDUSTRIES, March, 1938). In order to reach the mass market in territories beyond the reach of the product as previously packaged, the company is now packaging corn-chips in 3-oz. vacuum-packed, lithographed cans.



New DISCOVERIES AND INVENTIONS

FOOD ENGINEERING

Dust Explosions

HUMIDITY in the atmosphere retards dust explosions while, as a rule, no explosions will occur if the oxygen content of the dust-bearing atmosphere is kept below 12 to 14 per cent by addition of carbon dioxide.

Digest from Petit Journal du Brasseur, 45, 506, 1937 (Published in Belgium).

Hard Dried Fruits Softened

FRUITS that become hard, tough, shriveled or case-hardened during drying may acquire marketable qualities through the heat treatment and mechanical treatment described in U.S. Patent No. 2,092,666, granted to Henri Daniel Rey, Papeete, Tahiti.

The process is particularly applicable to prunes and similar pit-containin fleshy fruits, although not necessarily confined to these fruits. Its purpose is to make uniformly soft such fruits or fruit meats as are of low market quality because of the tough leathery or woody state of the dried fruit, the unattractive fruit sugar covering their surface, and the close attachment of pulp to the pit.

The fruit is heated for five or six minutes at 200 deg. F., or two to three minutes at 500 deg. F., to soften the sugars, syrups, and residual juices both on the outside and inside the fruit. Dry steam may sometimes be used in the heating chamber. While it is in this heat-softened state, the fruit is subjected to mechanical treatment which kneads or manipulates it to loosen up and expand the fibers, free the meat from the pit in the case it has a pit, and generally soften the fruit without breaking the skin. The fruit may then be given a boiling water immersion for one to six minutes, drained, and packed with an increased moisture content of not more than 25 per cent.

The mechanical treatment may be done in a machine (U. S. Patent No. 2,092,776) that (1) kneads or works the fruit, (2) subjects it to sharp blows or hammering from all sides, (3) rolls or drops it with heavy balls, (4) strikes it with high-speed paddle blows or (5) massages it between rubber-studded rolls.

Both patents are assigned to Anglo-California National Bank of San Francisco, San Francisco, Calif.

Keeping Surface Coolers Sterile

TO KEEP a surface cooler sterile, pump a disinfectant solution over it after each batch (brew). Never run more than two batches without sterilizing.

Digest from *Böhmische Bierbrauer*, 64, 305, 1937 (Published in Czechoslovakia).

METHODS OF PRESERVATION

Debunking Notions About Ice

CERTAIN BELIEFS, almost akin to superstition, about the cooling ability of various kinds of ice should be set at rest by the following data:

Kind of Ice	Latent Heat of Fusion B. t. u. per pound
Tap water ice (clear)	143.3
Tap water ice (white)	143.5
Clear ice, 3 months old	143.5
Clear ice, 1 day old ("green")	143.5
Chunk ice	143.5
Pulverized ice	143.5
Distilled water ice	143.6
Snow	142.7
Frost from coils	142.6
Benzoic acid ice	143.3
Eutectic ice (—6 deg. Melting Point)	102
Ice and Salt (Eutectic Mixture)	83
Dry Ice (to gas at —6 deg. F.)	266
Dry ice (to gas at 32 deg. F.)	275

Digest from "Ices," by O. C. Young. Progress Report No. 35, Pacific Fisheries Experimental Station, Fisheries Research Board of Canada.

Freezing Temperatures of Fruits and Vegetables

DATA regarding the freezing points of 34 kinds of commercial fruits and 45 vegetables are assembled in this bulletin. The temperatures given are to be considered only as danger points at or near which, either above or below, there is a possibility of freezing injury if exposed for a sufficient length of time. It must be recognized, however, that some products are injured by chilling if stored above their actual freezing temperature.

Digest from "The Freezing Temperatures of Some Fruits, Vegetables, and Florists' Stocks," by R. C. Wright, Bureau of Plant Industry, Circular No. 447, U. S. Dept. of Agriculture, Washington, D. C.

PACKAGING

Coated Aluminum Foil for Cheese Wrappers

ALUMINUM FOIL for wrapping melted cheese is subject to rather severe and rapid corrosion, so it must be protected by a corrosion-resisting film. On the basis of a systematic testing program, the principles which govern successful protection of the foil wrappers are stated. The foil and film must provide perfectly air-tight protection of the cheese. The aluminum foil itself must have a minimum thickness (preferably 0.0012 mm., i.e., 0.00005 inch), and must not show any pronounced scoring by the rolls in which it was made. The film coating should have no discontinuities and should not contain too many air bubbles. It must have good resistance to heat and strength to withstand mechanical stresses. It must retain good flexibility and should be, for all practical purposes, impermeable to weakly acid liquids. The film thickness should not be less than 0.00055 mm. (0.000025 inch). Coated aluminum foil which meets these requirements is an excellent and serviceable wrapper for melted cheese.

Digest from "Testing Coated Aluminum Foil for Melted Cheese," by E. Erbacher and H. Haug. *Deutsche Molkerei-Zeitung* 59, 108, 1938 (Published in Germany).

BAKERY PRODUCTS

Water-In-Oil Shortening

A DANISH INVENTION, patented in Sweden (Swedish Patent 91,341, granted Feb. 1, 1938 to H. Scheu, Juelsminde, Denmark), offers an improvement over previous methods of preparing dough for baking. The dough is treated with a water-in-oil emulsion, i.e., one in which water is the disperse phase and oil the continuous phase. Among other advantages, this type of emulsion serves as an effective but inexpensive and convenient shortening in biscuit. The emulsion should contain at least 20 per cent of water, in microscopically fine droplets, each surrounded by a sheath of oil or fat. As an example,

(*Turn to page 470*)

The PLANT NOTEBOOK

Electrical Tachometers Show Baking Time

Continuous ovens used in baking today require an accurate check on the speed of travel of their conveyors in order to insure proper baking, particularly where a large number of types of bakery products are put through, calling for variations in baking time. This indication serves as a guide for operation of the variable speed control, but it must be independent of the control mechanism itself if it is to reveal variations due to any cause the instant they occur.

Electrical tachometers, calibrated directly in minutes of baking time, provide one of the most responsive speed measurement methods available for this purpose. Actually the installation consists of two units: a magneto operated from the drive of the conveyor; and an electrical indicator which measures the voltage supplied by this magneto. As there is no mechanical connection between the point of measurement on the dial, installation is simplified and service troubles due to wearing parts are eliminated. This is the same type of speed indication used to meet the severe service and need for accuracy in airplanes and marine craft. Two recent applications of electrical tachometers reading directly in minutes of baking time, have been made at Schrafft's Stores and the Hanscom Baking Company, both in New York City.

At the catering department of Schrafft's Stores, the variety of pastries prepared requires baking time varying from 10 to 60 minutes. The oven is gas fired, with a baking space of 70x9 ft. A push button station adjacent to the indicating dial governs the speed by remote control. The tachometer is energized by a magneto on the variable speed shaft of the transmission.

One of the baking machines, made by the Gottfried Baking Company, is a double-lap, multi-tier, steam tube oven. Used for baking bread, rolls, and cake, the oven shown here is installed at the Hanscom Baking Company, Long Island City. The tachometer used on this machine, also calibrated in minutes of baking time, has an indicating range of 8 to 60 minutes.

Made by the Weston Electrical Instrument Corporation, Newark, N. J., such tachometers are now available with a new principle in construction of instruments of this kind. A brief mathematical consideration will indicate that an instrument pointer deflected proportionally to the shaft speed (r.p.m.) or to conveyor speed (ft. per min.) does not ordinarily provide evenly spaced scale divisions when calibrated in minutes of baking time. Due to the reciprocal relationship, the minutes of baking time increases rapidly towards infinity as the speed in feet per minute is decreased by equal increments towards zero.

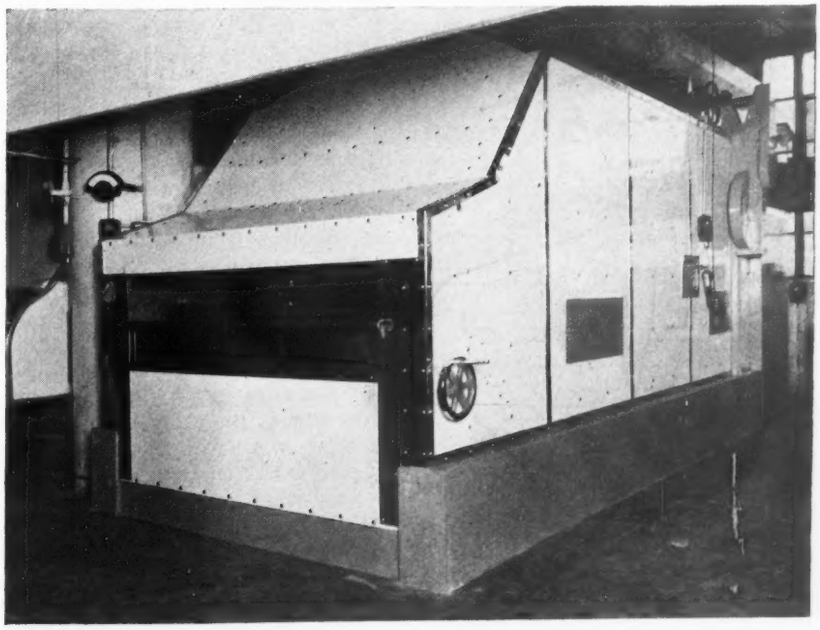
In the newest type of electrical tachometer, however, an "expanded scale" instrument has electrical characteristics so adjusted that there is no bunching of values at the end of the scale where baking time is at a maximum. The resultant even scale allows greater readability and less chance of confusion.—E. S. PATTISON, *New York, N. Y.*

Traps and Cooking Speed

Does the use of steam traps on steam jacketed kettles slow up cooking speed? Yes, but also no. The fact of the matter is that much depends upon the steam trap itself. In far too many cases, a steam trap is installed without due regard to its size in relation to the kettle it will serve, or it may be a trap of obsolete type which does relatively little good. Then, in observing that the cooking speed has been slowed down, there is often a tendency to place the blame on the use of steam traps, and some have resorted to juggling their valves around in order to drain away entrained condensate and any air that may be present. But such methods are wasteful of steam as well as having other drawbacks.

The real answer to the entire problem is to seek out recommendations from some reputable manufacturer of

Push button speed control and tachometer on oven in the catering department of Schrafft's Stores.



This oven, at Hanscom Baking Co., Long Island City, has the tachometer and push button speed control placed on an adjacent column.

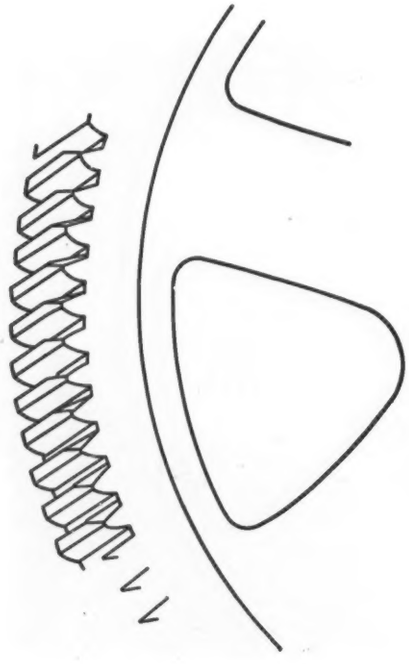
steam traps. If and when such a manufacturer gives his word that a given trap will produce a given result on a given kettle or other piece of steam-jacketed apparatus, he becomes responsible to produce the result. It is really very unwise to declare against the use of steam traps on steam jacketed kettles. To do so is to shut oneself off from the true basis of real cooking efficiency with reference to the amount of steam used.—JOHN E. HYLER, *Peoria, Ill.*

Beveling and Renewing Gear Teeth

Often, on equipment operated by means of a shift lever which when moved causes gears to mesh or unmesh, time is lost. Such gears must be in exact alignment before engagement by the shift lever is possible. To align the gears wastes time and sometimes teeth are stripped from the gears in the process.

We had this trouble on an ice cream brick cutting machine and overcame it by beveling each tooth on the meshing side, as shown in the drawing. The results are easier work for the operators and fewer stripped gears.

When teeth in cast iron gears are broken, they can be renewed by brazing and machining at a considerable saving over new gears. Such repairs frequently avoid a wait that might be involved if new gears were ordered. The resulting brass teeth, on soft gear work, are fully as serviceable as the original teeth.—BILLIE BURGAN, *San Diego, Calif.*



Beveled teeth make meshing easy.

Method of putting guard-weight on knife blade.

Sanitary Knife Guard

When our ice cream brick cutting machine misses a cut, or fails to finish a run, or when the operator for any other reason is compelled to cut the cream by hand, a knife is used. When the ice cream is hard, it is difficult to force the knife through it. However, we have made this operation easy by weighting the knife blade, as shown in the drawing.

This weight not only makes the cutting work easier, it also keeps the operator's hand off the ice cream. In addition, it protects the operator's hand, which is good safety business.

The guard was made by riveting two short pieces of Dural angle bar onto the tip end of the blade, one on each side. As knife steel does not drill easily, rivet holes were quickly burned through the blade by means of an oxy-acetylene torch, and the knife immersed for cooling before losing its temper.—BILLIE BURGAN, *San Diego, Calif.*

Unit Replacement Values

An idea that is practical and of great value in plant maintenance service is unit replacement of a part that goes bad.

For instance, on our ice cream brick cutter the shifting gear is the part that fails. This may be caused by trying to shift when the machine is in motion or by a bang of the carrier board against the teeth when the gear is in driving position. To avoid loss we have one spare gear on hand at all times. This can be quickly put in place and the broken gear is then repaired at leisure, without much delay at the machine.

Another point where breakage occurs is the driving yoke on the milk pump, which may need repairs in the middle of a run. A spare yoke is kept on hand to avoid lengthy shut-downs of this unit.

Bottle cages on the bottle washer sometimes get badly bent when there is a smash-up in the machine. With good extras on hand, the delay is only long enough to replace the unit.

Freezer blades, conveyor chain, hand truck claws and ice can lifts are some other units subject to damage, for which it pays to have extra units on hand.—BILLIE BURGAN, *San Diego, Calif.*

When is a Bolt Tight

Every once in a while somebody wants to know whether there is a wrench on the market that automatically tells the user when the bolt being tightened is sufficiently tight.

No doubt such a wrench, which might be called a "torque wrench," would be a good thing, but thus far I have not heard of one being offered or even made, so it will very likely be necessary to get along without such a device for a while longer.

Years ago when I was an installer of machinery I recall that I often broke bolts by pulling them up with too much vigor. I would probably do a poor job of gasketing, and in order to cover up that error and prevent leakage I would overstress the bolts. If necessary, I would slip a gas pipe over the wrench handle to give sufficient leverage to do the trick, which act, of course, is all wrong.

Making a wrench longer by "slipping a gas pipe over" is a simple procedure and it may look and sound good to some, but it is wrong to make a wrench longer in order to put nuts on tighter.

As every reader doubtless has observed, wrenches for small nuts are invariably short; for medium nuts, wrenches are medium in length; and for large nuts, they are long. The manufacturers therefore appear to have some "system" in making wrench lengths, and they have. The pitch of the thread is considered, the cross-sectional area of the bolt at the bottom of the threads is considered, and the average strength of the man who does the tightening of the nut is also considered.

To make a wrench "twice as long" you therefore increase the tension on the bolts to twice the amount, the force or pull on the wrench being the same. By increasing wrench lengths, I have frequently actually "stretched" bolts. Of course I usually stopped turning as soon as I felt the bolt begin to stretch, but that is exceedingly poor practice. Don't do it. The "point of stretch" of a bolt, sometimes called the "elastic limit," should never be reached. A stretched bolt is dangerous.

If you feel like making a wrench longer for "unscrewing" a nut—all right. But don't make a wrench longer for tightening a bolt.

A torque wrench would tend to eliminate the possibility of excessive bolt stresses and strains. Such a wrench would be a step in the right direction—in the direction of greater safety—and I dare say that someone, some day, will produce a practical wrench of that type for us—W. F. SCHAPHORST, *Newark, N. J.*

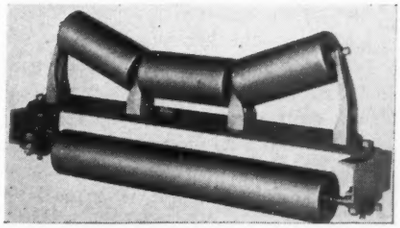
Food Equipment News

REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

Ball Bearing Idler

A LOW COST ball bearing belt idler for belt conveyors carrying moderate loads of semi- and non-abrasive materials, has been developed by Jeffrey Mfg. Co., Columbus, Ohio. Of the usual three-pulley, 20 degree troughing type, this idler is made for 14, 16, 18, 20, 24, 30 and 36-in. belts. Its ball bearings are of the commercial type, with a cork seal within a pressed steel labyrinth dust cap.

Pulleys are of 4 in. diameter welded steel pipe with formed steel gudgeons welded in at the ends. These gudgeons are connected within the pulley by steel tubing which prevents the loss of grease into the pulley proper. Shafts are $\frac{5}{8}$ in. seamless tubing, held by set screws within machine bored holes in the stands. As these shafts are hollow, the entire idler may be lubricated from either end through pressure fittings. Base angles are inverted to shed material.

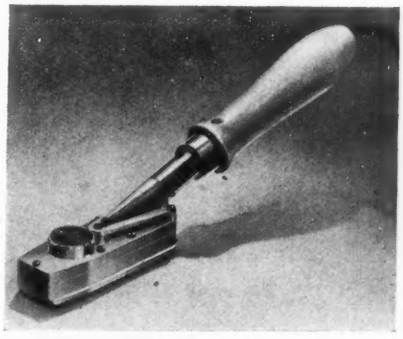


Ball bearing belt idler.

Heat Sealer for Packages

WELLS MFG. CO., 222 Ninth St., San Francisco, Calif., is making "Thermosealer," a package sealing iron said to prevent burning or sticking. This sealer has automatic temperature control and can be adjusted to suit all ordinary heat sealing wrappings. The temperature control can be adjusted to the correct sealing temperature of each material and to the efficient working speed of the operator.

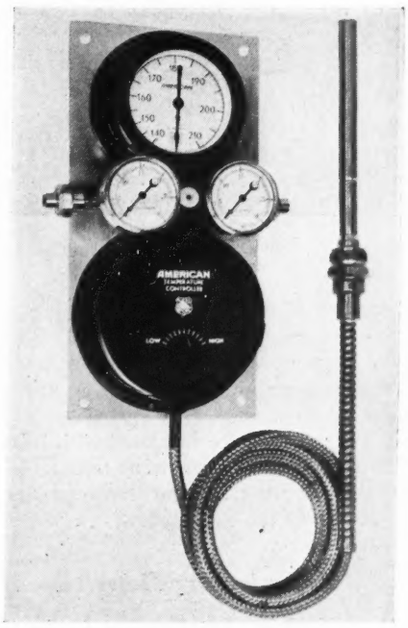
This device is provided with a handle which can be removed when the sealer is to be mounted on wrapping machines or sealing devices.



Automatically controlled heat sealing device.

Wide Range Controller

CONSOLIDATED ASHCROFT HANCOCK DIVISIONS, Manning, Maxwell & Moore, Inc., Bridgeport, Conn., are making a wide range indicating controller for temperature. This instrument combines this company's non-indicating wide range controller with the "American" indicating thermometer. The combination provides both instruments on one mounting, an aluminum plate, which can be attached conveniently at the apparatus being controlled.



Wide range indicating controller.

Mold and "Rope" Inhibitor

E. I. DUPONT DE NEMOURS & Co., National Ammonia Division, Frankford, Pa., recently announced an inhibitor of mold and "rope" in bread, called "Mycoban." This inhibitor is introduced into bread as an ingredient, so that every part of the loaf is protected.

The inhibitor is based on the action of propionic acid, small amounts of which are found in many foods, but particularly in Swiss cheese, where it exhibits a mold-inhibiting action. As propionic acid is a liquid that cannot be handled and shipped easily, "Mycoban" contains one of its salts, a white, flour-like solid. It also contains a small amount of ammonium bicarbonate.

The manufacturers state that, since most bakers are satisfied with a five-day hold up of mold growth, 2 to 3 oz. of the new inhibitor for each 100 lb. of flour will prove ample. It is also stated that $3\frac{1}{2}$ oz. of the inhibitor per 100 lb. of flour will completely stop the growth of "rope" spores.

Pulley Lagging

ROCKWOOD MFG. CO., 1801 English Ave., Indianapolis, Ind., has developed a new fiber lagging for mounting on pulleys and flywheels. Provided with an improved clamp, the purpose of this lagging is to increase the diameter of pulleys, permitting higher belt speeds, and to make it unnecessary to operate the belt tight, thus increasing belt life and reducing maintenance. The increased belt speed also increases the capacity of the driven machine. It is claimed that, compared with cast iron, the surface of this fiber will transmit at least 50 per cent more power.

The laggings, called "Fibre Lag-

gings," are supplied in any width and up to 72 in. in diameter. They are applied by clamping on the rim of the wheel.

Vibrating Screen

AJAX FLEXIBLE COUPLING CO., Westfield, N. J., is making a vibrating screen of the flat type, designed for minimum height and for floor, ceiling, or wall mounting. The screening compartment and drive unit are completely enclosed in dust and oil-tight housings. The screen is equipped with round, beaded intake and outlets for dust-tight feeding and discharge through stockings or boots.

The screen unit is driven by an Ajax-Shaler shaker mounted directly on the bottom of the screen. This shaker uses no eccentric, but imparts a smooth reciprocating motion to the screen by means of rotating weights. Speed and stroke lengths are variable to suit the properties of the material being screened and the volume being handled.

Vari-Pitch Speed Changer Has Manual or Electric Control

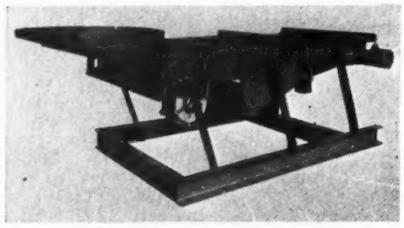
TEXROPE DIVISION, Allis-Chalmers Mfg. Co., Milwaukee, Wis., has developed a speed changer unit using this company's multi-groove, "Vari-Pitch" sheaves. The speed changer consists of a totally enclosed, compact unit with double shaft extensions, driven from a standard motor. It can be either manually controlled by a hand wheel, or equipped for remote electric control. Manual remote control is also possible. The range of capacities now being offered include ratings up to 33 hp. with ratios as high as 3¾ to 1.

Vari-pitch speed changer.

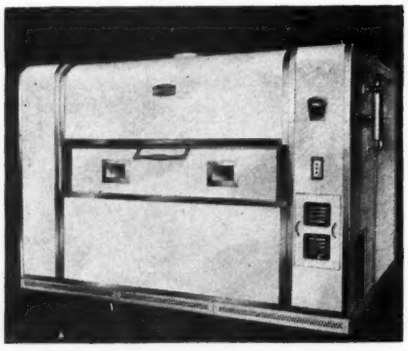
Revolving Tray Oven

READ MACHINERY CO., INC., York, Pa., has brought out a new model of revolving tray oven, featuring stabilized trays, operating economy, uniform baking quality and flexibility. This oven has a stabilizing ring which maintains horizontal tray positions even under heavy loads. This results in avoidance of "cripple" losses, even with the most delicate cakes. Fully automatic gas or oil burners, operating in a furnace which extends the full length of the oven, result in even heat distribution and uniformity of bake. Fire brick checker work is used to maintain even lateral heat distribution.

These ovens have a large steam hood over the door, to protect the operator from escaping steam and heat while the door is open. Control of the reel, forward and reverse, is by push-buttons. The bake can be watched at all times through Pyrex glass windows in the peel door. This door is a suitable height to eliminate stooping when loading or unloading.



Vibrating Screen



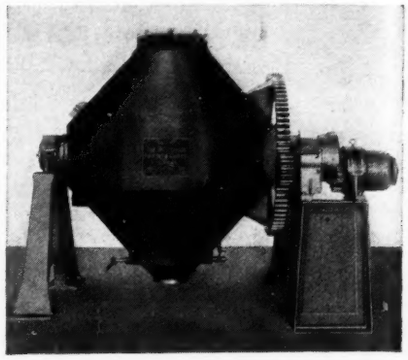
Revolving tray oven.

A steam damper, controlled from the oven front, permits quick removal of excess steam or flash heat from the baking chamber.

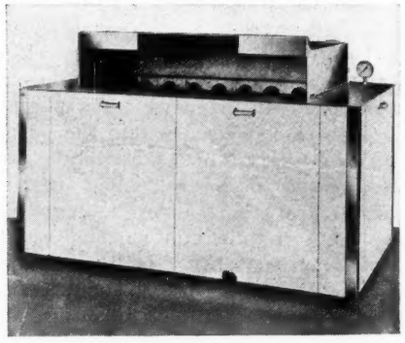
These ovens are insulated with 8 in. of rock wool. Air circulation under the oven prevents heat from passing through to the floor below.

Mixer for Dry Materials

A CONICAL TYPE dry blender or mixer is being made by Patterson Foundry & Machine Co., East Liverpool, Ohio. This mixer is obtainable in several sizes and is built in plain steel, stainless steel and other metals. The makers claim that this mixer gives a uniform mixture in short time, even when additions as small as 1 or 2 per cent are incorporated in a large quantity of material. The mixer is designed for easy cleaning and low power consumption.



Conical type mixer for dry materials.



New model pan greaser has white enamel, stainless steel trimmed cabinet.

Pan Greaser

UNION STEEL PRODUCTS CO., Albion, Mich., has brought out a new model of the "Sur-Atomic" pan greaser. This operates by compressed air, heated grease being sprayed onto the inside surfaces of the pans in the form of a fog from eight spray nozzles.

The cabinet of this new model is of white vitreous enameled metal, with trim of stainless steel. A feature is the vacuum vapor exhaust, to draw off excess grease fog, condense it and reclaim the grease.

Capacity is 1,200 to 1,500 straps of pans per hour. Grease consumption is from 10 to 12 oz. per 1,000 lb. of dough. The greaser operates from any ordinary light socket and can be adjusted to fit any size of pan.

Just Off The Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

CANNING EQUIPMENT—"Efficiency in the Canning Plant" is the title of Catalog No. 38, describing the complete line of canning machinery and supplies manufactured by H. F. Langsenkamp Co., Indianapolis, Ind.

CONVEYING EQUIPMENT — "Natural Laws Applied to Production" is the title of a 32-page catalog treating of the continuous flow principle of handling materials, published by Mathews Conveyor Co., Ellwood City, Pa.

CONVEYING EQUIPMENT—Standard bucket elevators of all types, for all purposes, and accessories for same, are described and specified in a 56-page catalog, No. 1900, issued by Sprout, Waldron & Co., Muncy, Pa.

CONVEYING EQUIPMENT—In a bulletin entitled "Equipping Industry for Continuous Production," Mathews Conveyor Co., Ellwood City, Pa., illustrates and discusses the applications of various types of conveyors in various industries.

CUTTING EQUIPMENT—Celery dicers and vegetable slicers are described in two leaflets, published by American Utensil Co., Chicago, Ill.

HOMOGENIZERS — What homogenization is and its application to the products of the dairy industry, is the subject of a 32-page bulletin issued by Cherry-Burrell Corp., 427 W. Randolph St., Chicago, Ill.

ICING MACHINES—A device for icing cakes, doughnuts, buns and other sweet baked goods, said to save 20 per cent of the material and 85 per cent of the labor, is the subject of an illustrated folder published by Tenney Engineering Co., 49 Dickerson St., Newark, N. J.

MATERIALS HANDLING EQUIPMENT—Casters, trucks and pneumatic wheel equipment for use in interior handling systems are illustrated and described by Saginaw Stamping & Tool Co., Saginaw, Mich., in Catalog No. 38CG-2.

MATERIALS HANDLING EQUIPMENT—"For Greater Safety" is the title of a new circular issued by Lewis-Shepard Co., 280 Walnut St., Watertown, Mass., which shows ways of introducing safety into the indoor transportation of materials.

REFRIGERATION EQUIPMENT — Baker Ice Machine Co., Inc., Omaha, Neb., has issued illustrated bulletins as follows: S.D.44, vertical inclosed uniflow type safety head compressors; S.D.45, the Baker line of advance type refrigerating units; S.D.49, Baker "Cold Stream" cooling unit; S.D.59, Baker units for air conditioning; S.D.54, shell and tube condensers.

Plant Accessories and Supplies

AIR-POWERED EQUIPMENT—The use of air-power hoists and other equipment is discussed in a 28-page booklet issued by Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis, Mo.

DUST REMOVAL—Claude D. Schneible Co., Chicago, Ill., has published a report of a project carried out at the University of Michigan on the efficiency of multi-wash dust collectors in the removal of dust.

LUBRICATING EQUIPMENT — "Pressure Lubrication Without Special Fittings" is the title of a folder describing the Acco-Morrow pressure lubricator, issued by American Chain & Cable Co., York, Pa.

PLANT PIPING—Wrought iron for piping systems is the subject of a 40-page illustrated catalog published by A. M. Byers Co., Pittsburgh, Pa.

SPEED REDUCERS — Catalog No. 24, Philadelphia Gear Works, Philadelphia, Pa., is a 124-page complete catalog of this company's line of worm gear speed reducers.

STEAM JET EJECTORS—Single, two and three-stage ejectors for removing air, gas or vapor from condensers and vacuum chambers, form the subject of a 28-page illustrated bulletin of Ingersoll-Rand Co., Phillipsburg, N. J.

TRAP APPLICATIONS—"Steam Hook-Ups" is a 30-page illustrated bulletin showing the proper method for hooking up traps made by Sarco Co., Inc., 183 Madison Ave., New York, N. Y., to various types of equipment.

VALVES — Reference Book No. 38, Homestead Valve & Mfg. Co., Coraopolis, Pa., is a 48-page illustrated catalog of blow-off valves, lift-plug valves, Homestead valves and other equipment made by this company.

VALVES—Specifications of a complete line of bronze valves are given in Bulletin 4-4500, an 8-page illustrated publication of Hancock Valve Div., Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn.

VIBRATION ELIMINATION—A technical paper, describing the theory and practice of vibration elimination, by President Rosenzweig of the Korfund Co., Long Island City, N. Y., has been reprinted for distribution by that concern.

Packaging

CONTAINER SEALING — Robert Gair Co., Inc., 155 East 44th St., New York City, has published a booklet entitled "A Textbook on the Sealing of Corrugated and Solid Fibre Containers," by J. D. Malcolmson. This is a 36-page illustrated booklet covering all methods of sealing used for this purpose.

Control Equipment

HUMIDITY CONTROLLER — Hygrometers for recording and controlling humidity in industrial and other air-conditioning applications are described with application information in a 28-page illustrated catalog of Brown Instrument Co., Philadelphia, Pa.

RECORDING INSTRUMENTS — Bulletin No. 496 of the Bristol Co., Waterbury, Conn., discusses recorders for electrical unit measurements and their applications in the food industries.

Distribution Equipment

FROZEN FOOD CABINETS—Frigidaire Division, General Motors Sales Corp., Dayton, Ohio, has issued an illustrated booklet, showing new models of "Frosted Food Chests," developed for the retailing of frozen foods.

REFRIGERATED DISPLAY CABINET—Model 68DL, all-steel, 3-shelf refrigerated display cases, series 1950, are described in an illustrated folder of C. D. Hill & Co., Inc., Trenton, N. J.

News

General News—Business Trends—Men, Jobs and Companies

Packer Seeks Ruling On Power of Wallace

Swift & Co., Chicago, proposes to find out from the Circuit Court of Appeals whether its own executives or the Secretary of Agriculture has the right to make management decisions about its business. The company has appealed the cease and desist order in which Secretary Wallace charged it with "unjustly discriminatory" credit, discount and weight practices. Three important points are involved:

1. The company maintains that it gives no discounts which are significant in affecting competition among its customers. Certain discounts given are intended to move goods promptly, not as "favors".

2. The extent to which credit can be granted to certain customers is, the company believes, to be decided by the company, not by the Secretary of Agriculture working under the Packers and Stockyards Act.

3. Also at issue is the difference in prices charged between packaged goods and like goods removed from packages and sold with allowance for shrinkage which occurred.

In recent cases the Secretary of Agriculture has assumed the right to dictate to packers policy decisions on these and like questions. The appeals court has been asked to decide where the Secretary's authority ceases. One question at issue will be whether many of these transactions are in any event interstate commerce, or whether most of them are intrastate business, not subject to federal regulation.

FTC Approves Rules For Macaroni Industry

Trade practice rules for the macaroni, noodles and related products industries have been approved and promulgated by the Federal Trade Commission.

The new rules apply to misrepresentation of industry products, give specifications for macaroni and noodle products, and cover use of deceptive coloring or deceptive containers, deception as to additional food ingredients, deceptive illustrations in advertisements, on labels, etc., defamation of competitors or disparagement of their products, failure to brand industry products, selling below cost, imitation or simulation of trademarks, publication or circulation of false or misleading price quotations, false invoicing, discriminatory prices, rebates, refunds, credits, etc., brokerage and commissions, advertising or promotional allowances and discriminatory services or facilities.

CONVENTIONS

August

17–20—National Food Distributors' Association, Hotel Cleveland, Cleveland.

30–Sept. 1—Society of American Bacteriologists, St. Francis Hotel, San Francisco.

September

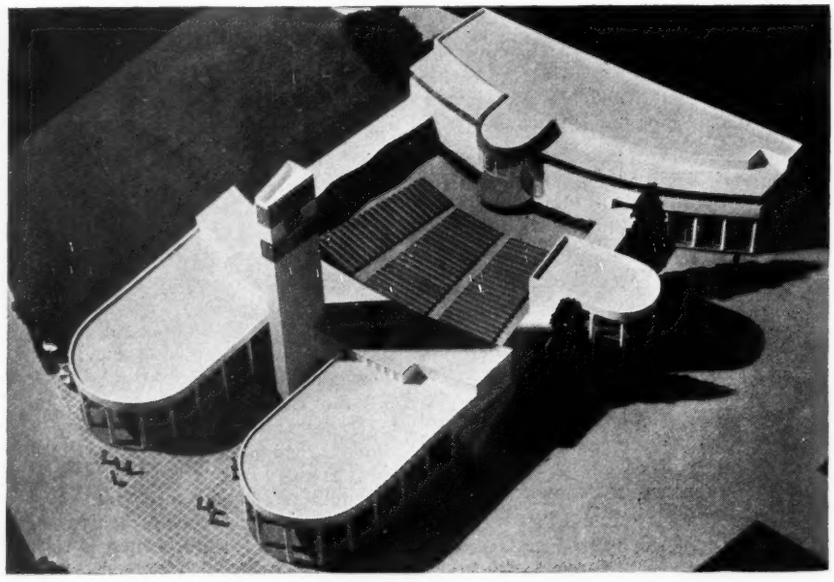
19–21—Super Market Institute, Hotel Sherman, Chicago.

26–27—Tenth Boston Conference on Distribution, Hotel Statler, Boston.

New York City Council Gets Radical Food Bill

Tugwell's original food and drug bill had nothing on the food, drug and cosmetic measure recently introduced in the New York City Council to amend the administrative code of the city in respect the manufacture and sale of foods, drugs and cosmetics. Introduced on July 7, just before the Council adjourned, the proposed law has the backing of five labor members of the Council.

The law provides for the registration of proprietary products and the filing of a complete qualitative and quantitative composition or formula of the product sought to be registered. Denial of a certificate of registration for a proprietary product can be made if the product is not manufactured under the continuous supervision of a licensed pharmacist, chemist or other qualified



EDUCATION IN FOODS AT FAIR

Standard Brands, Inc., New York, will promote its products and those of the bakery industry through educational exhibits to be staged in a group of four pavilions at the New York World's Fair. Fair goers will see a model bakery in complete operation, will pedal bicycles to see how much energy is provided by bread, will witness continuous marionette shows of the company radio's programs and will partake of refreshments at a 100-ft. coffee and tea bar. Visitors to the exhibits may learn whether their daily menus contain enough vitamins by manipulating push buttons.

technician. A food, drug or cosmetic shall be deemed misrepresented under the law if the label fails to state the presence of artificial flavor, color or chemical preservative, if any labeling or advertisement is false or misleading in any particular, or if any labeling or advertisement contains any claim not listed on the official application blank or substantially different from those listed. A provision that hits at secrecy in formulas is one that calls a proprietary product misrepresented if its label fails to bear the complete quantitative and qualitative formula of the product. Exemptions, however, are permissible under this rule.

Perhaps the most revolutionary of the provisions is one which calls for the establishment by the board of health of a definition or standard of identity for foods and the setting up of numerical grades or standards of quality for foods.

To make the provisions stick, the proposed law establishes penalties which range up to imprisonment of not less than ten days and a fine of not less than $500 for a third offense.

Manufacturers Consider New Food and Drug Law

For the purpose of dealing with the many scientific problems which will present themselves in the making of regulations necessary to the successful administration of the new Food, Drug and Cosmetic Act, "The Chemists Committee of AGMA" will be created by Associated Grocery Manufacturers of America. This was announced on July 20 at a meeting in Chicago, at which the new law was discussed. A similar meeting had been held in New York earlier, and following this first conference, Paul S. Willis, president of AGMA, made the statement that the full effect of the recently enacted law was not appreciated by many food executives. He urged all concerned to study the law carefully so as not to slip up after it becomes effective.

The new law will present many scientific problems during the coming twelve months, while regulations are in process of determination, and with the help of the special chemists committee, AGMA will be ready to deal intelligently with the subect matter, Mr. Willis said.

"This new act undoubtedly will stimulate requests by distributors asking manufacturers for a guarantee of compliance with it," Mr. Willis says, "and the association plans to prepare a model form of guarantee for manufacturers' use."

For a summary of the provisions of the Food, Drug and Cosmetic Act, see FOOD INDUSTRIES, page 432.

New Contract for Bakers

Flour which is not shipped within 120 days from date of contract automatically increases in price at the rate of 1/6 cent per barrel per day, beginning on the 121st day and continuing until the time of shipment, under a new uniform flour contract jointly approved by Millers' National Federation and American Bakers' Association for use in the baking industry. In addition to the automatic price increase, the contract contains provisions covering net

CAPITAL VIEWS

BETTER BUSINESS—Washington is convinced that business is better, and that reemployment is going on. Nobody understands the sudden boom in the stock market or the attendant improvement in real business. But it is welcomed for political reasons regardless of its source. Food executives should expect, however, that the larger tonnage of business does not necessarily mean better prices, nor even better profits, under the present official philosophy.

UP THE LADDERS—The Bureau of Fisheries reports that salmon successfully climb the fish ladders in the Columbia River at the Bonneville Dam. This shows that at least half of the plan for preserving the salmon packing industry of that territory has seemingly succeeded. The second half will be solved if the young fingerlings get safely down past the dam, when they start to sea, without being converted to fish meal in passing through the high- and low-pressure areas in the penstocks and turbines on the way down. Final answer can come only after four years, when the present young salmon will be big enough to pack.

SURPRISE VETO—The President vetoed the stream-pollution bill, to the surprise of almost everyone. He objected to the provision which would have arranged for recommendations of the Public Health Service to go directly to Congress, demanding that the President supervise these matters as a part of general budget control. All authority must be centered in the White House under the present regime. The President trusts no one else to disperse monies, lest they be used without appropriate political benefit.

REGIONAL LABS—Processing of surplus crops will be studied at four regional laboratories to be established later this year by the Department of Agriculture. Preliminary indications are that the far-Western laboratory will deal largely with byproducts of food processing and some of the canning and preserving research needed to handle fruit and vegetable surpluses. The Southern laboratory will deal with cotton, principally; and the mid-Western one with corn and other grain. But no definite program has yet been selected for the Eastern lab.

WHO IS BOSS?—Uncle Sam now makes more decisions than management officials. One Washington cynic says, "Management is really no longer necessary." Perhaps this is why big salaries seem so wrong to New Dealers. All this reminds us of the days when Secretary of Commerce Hoover used to complain that 11 different bureaus and departments managed the bears' business. There are more than this managing the food business from Washington. Witness:

1. The officers of a company may no longer decide who may come onto the land owned by the company, especially if it is a company town. (Decision of NLRB)
2. Interstate travel of officers in the case of a strike at a plant may be a criminal offense if any disorder results while they are present. This also hits labor union organizers and officials! (NLRB interpretation)
3. Executives of companies are not permitted to express publicly their opinions regarding one union or another, as this constitutes illegal interference with the rights of their employees.
4. The NLRB has the right to decide who will be hired first and who may be fined, if anyone.
5. Pricing systems and many pricing details are now subject to FTC control.
6. The SEC decides whether we may borrow, from whom, how and when, and how we must pay it back; unless we borrow from Uncle Sam, when RFC does the deciding.
7. Now comes the Wage-Hour Administration of the Department of Labor with the right to decide wage rates, working hours and the definition of overtime.
8. Congress restored the rights of a company to decide when it should pay dividends from its profits, if any!

HOW MANY TO EAT—The latest estimate of the National Resources Committee is that the population of the U. S. will reach a peak at 158,000,000 persons by 1988. But there is also included an alternate guess that by 1955 a maximum of 139,000,000 may prove to be the top. These estimates are highly uncertain. But it is sure that there will be fewer young eaters relatively and more old folks who don't eat much, as the current changes in population take place.

SEASONAL INDUSTRY—Under the new wage and hour law the administrator can decide, among many other policies, what constitutes a seasonal industry. This definition is important because such industries will be exempt from the ordinary 40-hour maximum week, provided the overtime work does not exceed 14 weeks per year. When food processors are exempt as agricultural industries may also prove a big problem in a few cases.

WHEN WILL IT BE 40–40?—Many business executives have overlooked the fact that the wage-hour administrator when appointed to take charge of labor matters may fix immediately for particular industries the 40-hour week and 40-cent minimum wage hour. Normally it will take seven years to reach such "standards," but not necessarily. Meantime the Department of Labor has fixed under the Walsh-Healy Law a number of minimum wage rates equal to prevailing union wages. A large number of these are well over 40 cents, usually requiring a $17 per week earning as a minimum, assuming a 40-hour week. Up go costs!

weights, collections, taxes, shipments, warranty, rights of buyer, rights of seller, provision for automatic extension and limitation of actions. Copies may be obtained at cost from American Bakers' Association.

Department of Justice Alleges Milk Monopoly

An inquiry which may turn out to be of considerable significance was launched July 8 before a Federal grand jury in the northern district of Illinois with reference to the distribution and sale of milk and cream in the Chicago area. The purpose of the inquiry, the Department of Justice states, is to ascertain whether prosecutions of dairy companies and others concerned will be necessary under the Sherman Antitrust Act.

According to the Department of Justice, evidence collected during a preliminary investigation indicated that everything was not as it should be in the Chicago milk shed. The evidence is alleged to show maintenance of rigid and inflexible prices for milk and cream by the larger distributors and other groups cooperating with them. And it is alleged that as a result of such price maintenance the producer receives an extremely low price for milk while high prices are paid by the consumer. This condition is not accidental, the Department of Justice asserts, but is caused by conspiracies in restraint of trade. However, the Department does not feel in a position to make positive charges against individuals or corporations until final inquiry by the grand jury is had and final evidence is produced.

The effect of this investigation is not limited to Chicago. The Department of Justice believes that the conditions existing in the mid-Western metropolis obtain more or less throughout the country. Proceedings were started in Chicago because it is asserted that the unsatisfactory conditions exist there in extreme form, the city thus furnishing "an unusual opportunity to test the effectiveness of the antitrust laws to meet an outstanding problem of American business and social economy."

Trade Rules Proposed For Tomato Industry

Proposed trade-practice rules for the tomato-paste manufacturing industry were announced recently by the Federal Trade Commission. These rules are in two groups. Group I covers (1) misrepresentation of industry products; (2) specification that tomato paste contain not less than 25 per cent solids, and that heavy tomato paste contain 33 per cent solids; (3) misrepresentation under rule (2); (4) misrepresentation as to artificial color; (5) misrepresentation as to tomato content; (6) deceptive illustrations of products; (7) defamation of competitors and disparagement of their products; (8) substituting inferior products for those ordered; (9) commercial bribery; (10) inducing breach of contract; (11) enticing away employees of competitors; (12) selling below cost; (13) discriminatory prices, brokerages and commissions, advertising or promotional allowances and services or facilities; (14) misrepresentation as to basil, etc.

Group II of the proposed trade practice rules pertains to (*A*) repudiation of contracts, (*B*) fake or fictitious bids, (*C*) disclosure of quality of products, and (*D*) dissemination of credit information.

Issues Soybean Warning

Warning to the soybean industry against overexpansion has been sounded by the Bureau of Agricultural Economics. This advice grows out of a broad economic study of the industry. The particular point is made that the products which compete with soybeans have for the past three or four years been in rather small supply, opening the way for profitable expansion in soybean production. For the future, however, the situation will be different, the Bureau predicts. Cottonseed and linseed oil and meal and lard, the chief competitors of soybean products, are expected to provide keener competition. On the question of whether the substantial foothold gained by the soybean industry can be maintained, the Bureau says that no answer can be given now.

Kitchen for Canners

New recipes for the canning industry will be developed and tested in the new service kitchen recently opened by the home economics division of National Canners' Association, Washington, D. C. The work of the kitchen will be under the direction of Marjorie Black. The policy adopted for its operation specifies the handling of requests in the order in which they are received. Each canner wishing to have recipes developed, or have tests made of recipes already in use, will be asked to furnish his proucts.

The first work to be done in the new kitchen will be the preparation of a series of family size recipes to replace "227 Tested Recipes for Canned Foods." But the development of these recipes will not interfere with the work for individual canners.

CONCENTRATES

• The new Federal Food, Drug and Cosmetic Act "broadens the scope of the old law and, in many respects, reinforces those provisions which have stood the test of time," is the opinion expressed by Secretary Wallace. "It will benefit honest manufacturers who are entitled to government protection against unethical competitors," he said. . . . The Barkley-Vinson water-pollution bill (H.R.10650) authorizing a $3,260,000 program for the Bureau of Fisheries, was vetoed by President Roosevelt. . . . Pennsylvania's 44-hour week law has been ruled unconstitutional by the state supreme court.

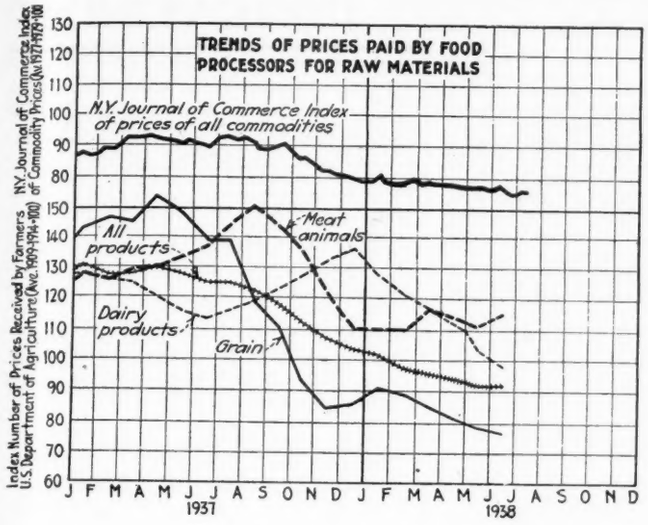
• *Geo. A. Hormel & Co., Austin, Minn., has placed one of its products, Spam, under the provisions of the Illinois fair trade act and has set the minimum price of a 12-oz. tin at 29 cents . . . Frosted Foods, Ltd., has been formed in England, Frosted Foods Sales Corp. announces. Headed by Robert Ducas, the foreign branch will license food processors in Great Britain but will not prepare and market quick-frozen foods there. . . . Quick-frozen foods are now being used by more than 6,000,000 persons, and Frosted Foods expects to expand its frozen food retail outlets from 3,000 to 4,500 during the present year, according to Edwin T. Gibson, president of the company.*

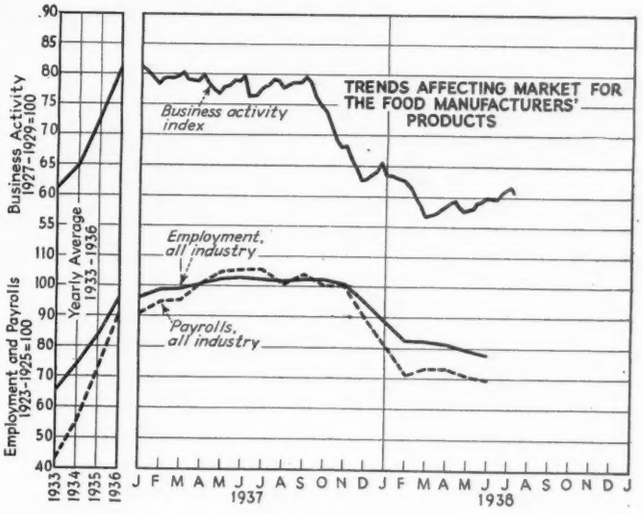
• Construction of a $700,000 farmers' cooperative sugar cane mill at Breaux Bridge, in St. Landry's parish, Louisiana, will be financed by New Orleans Bank of Cooperatives. Six other mills financed by the bank will be remodeled and enlarged . . . Contracts for $45,000,000 of foodstuffs to feed the CCC will be awarded during the fiscal year which began July 1.

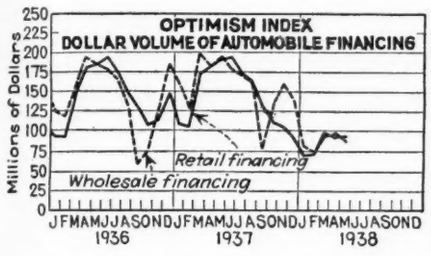
• *Test shipments of citrus fruits in woven, waterproofed paper fabric bags and open-mesh cotton fabric bags from California to the East are being made by bag manufacturers. Following the test shipments, the firms will seek to have the Interstate Commerce Commission specify that the bags are suitable shipping containers for citrus fruits . . . In New York state there is excellent opportunity for the manufacture of cherry juice, in the opinion of Dr. D. K. Tressler, who has studied methods of processing the juice and summarized his findings in a circular, "Cherry Juice and Cherry Beverages." Copies of the circular may be obtained from New York State Agricultural Experiment Station, Geneva. . . . Millers' National Federation, Washington, has created a public relations division.*

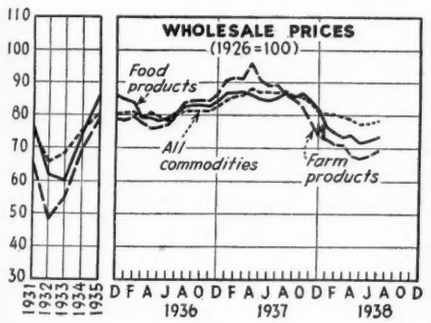
• A project to establish a national cooperative canning enterprise is being studied by the Mexican government, the American commercial attache at Mexico City reports . . . National Canners Association has adopted a list of terms to be used in the descriptive labeling of peas. . . Simplified Practice Recommendation R171-38 covering wooden boxes for canned fruits and vegetables has been approved by the industry . . . Simplified Practice Recommendation R170-38, pertaining to spice containers, has been accepted by the industry.

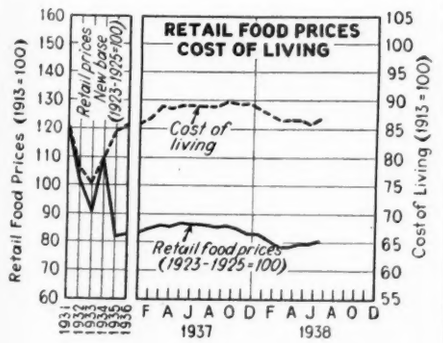
• *A $50,000 industrial brewery display is being planned by Acme Breweries for the 1939 Golden Gate International Exposition . . . U. S. Frozen Pack Laboratory has moved to the University of Washington campus, Seattle, to obtain more laboratory and office space . . . Booth Fisheries Corp. will sue General Foods Corp. for infringement of patents covering quick freezing apparatus and processes.*


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
All products
Meat animals
Dairy products
Grain
Index Number of Prices Received by Farmers, U.S. Department of Agriculture (Ave. 1909-1914=100)
N.Y. Journal of Commerce Index of Commodity Prices (Av. 1927-1929=100)
1937
1938









Prices received by farmers are from the U. S. Department of Agriculture. Employment, payrolls, wholesale prices and retail prices from the U. S. Department of Labor. The business activity index is that of *Business Week*. The cost of living index is from the National Industrial Conference Board. The data on retail and wholesale financing of automotive purchases is from the U. S. Department of Commerce.

BUSINESS TRENDS

Crop Prospects Good

Being in the heart of the harvest season, news of the crops is matter of first moment to all food processors. Earlier forecasts of bountiful yields in most food commodities are holding up with continued ample rains and good growing weather over most of the country. This outlook was strengthened on July 11, when the Federal Crop Reporting Board issued its July forecast.

According to this report, the country is facing the second largest wheat crop on record, with a total expected harvest of 967,412,000 bu. compared to 873,993,000 bu. in 1937, and a 1927-36 average of 752,891,000. A larger than normal corn crop was also predicted, with a total of 2,482,102,000 bu., which compares to 2,644,995,000 bu. last year, and a 1927-36 average of 2,306,157,000 bu.

Other grain crops also promise to be abundant, with oats forecast at 1,093,829,000 bu., barley at 239,375,000 bu., rye at 51,327,000 bu., and 53,330,000 bu. of rice.

Field crop estimates indicate 13,559,000 hundred lb. bags of dry edible beans, compared to a ten-year average of 12,053,000 bags; 386,660,000 bu. of potatoes, compared to a ten-year average of 369,693,000 bu.; sweet potatoes at 82,417,000 bu., compared to a ten-year average of 70,274,000 bu.; and sugar beets at 10,785,000 tons, compared to a ten-year average of 8,383,000 tons.

Large fruit crops are also promised. Apples are forecast at 134,394,000 bu., the ten-year average being 150,728,000 bu. A crop of 53,651,000 bu. of peaches was estimated, comparing to the 1927-36 average of 52,498,000 bu. Pears and grapes also promise to exceed the average crop, with pears forecast at 31,049,000 bu., and grapes at 2,465,000 tons.

Estimates as to prospective yields of vegetables were not released by the Federal Crop Reporting Board. However, information from various sources indicates that production of many of these crops will greatly exceed both last year's output and the ten-year (1927-36) average crop. This seems to be true of snap beans, lima beans, cabbage, carrots, beets, cucumbers, lettuce, cantaloupe, and watermelon. In contrast, smaller crops are in prospect for onions, green peas, and green peppers. Prospects for tomatoes are still better than average, although below last year.

Commodities Turn Up

Most commodity prices increased during the month from June 15 to July 15, with grain and grain products the outstanding exception. Meat prices all advanced, with beef up 2½ to 3 cents per lb., lamb up 4 to 4½ cents per lb., and pork up 3½ to 4½ cents per lb. Egg prices increased from 1 to 1¼ cents per doz., butter was up ¼ cent per lb., and cheese up from ¼ to ½ cent per lb. Among the imported commodities, cocoa scored a definite increase, rising from $4.65 to $5.25 per 100 lb., while raw sugar advanced 1 cent per 100 lb., and coffee increased from ¼ to ½ cent per lb. Lard also made a considerable advance during the month from $8.95 to $9.60 per 100 lb. Canned foods showed little change. Wheat dropped about 15 cents per bu. on reassuring crop news, while flour paralleled this decrease with a drop of 50 cents per bbl. Corn was off ¼ cent per bu. for the month.

During this period of a month, various commodity indexes have behaved

as follows: The *New York Journal of Commerce's* weekly index of commodity prices stood at 77.0 on June 18. By July 2, this index had fallen to 76.2; but on July 16 it stood at 77.3, thus recording a slight gain for the period. The more sensitive daily index of commodities, prepared by the same publication, rose from 114.9 on June 16 to 121.5 on July 16. Moody's index, for the month ending July 9, rose from 134.3 to 146.3. *Business Week's* index of business activity, for the June 11-July 9 month, increased from 59.6 to 60.7.

More Fish Available

Reversing the trend evident in 1937, supplies of fish are again available in ample proportions. Reports of the Bureau of Fisheries show that, on May 15 of this year, fishery products in cold storage totaled 45,810,000 lb., 13 per cent more than the 40,598,000 lb. in storage on May 15, 1937 and 67 per cent greater than the 27,363,000 lb. five-year average for the date.

By June 15, one month later, the supply of fish had made another 14 per cent gain over 1937, totaling 54,919,000 lb. This compared to 48,178,000 lb. on June 15, 1937 and was 44 per cent above the 38,150,000 lb. five-year average.

During the month ending May 15, 18,209,000 lb. of fishery products were frozen, and in the succeeding month the amount which was frozen totaled 19,185,000 lb.

Sugar Consumption Off

Sugar deliveries for domestic consumption in the United States, first five months of 1938, were about 18.9 per cent below the total recorded for the same period of 1937, according to a recent report of the sugar section of AAA. The total this year was 2,248,772 short tons, raw value, compared to 2,774,607 tons for the period last year. Stocks of sugar on hand in this country on May 3, 1938, totaled 1,824,629 short tons, raw value, compared to 1,487,470 tons on the same date of 1937.

Construction News

	Pending (thousands)	Awarded July (thousands)	Total Awarded 1938 (thousands)
Bakery	$123	$90	$648
Beverages	330	135	2,522
Canning and Preserving	40	.....	240
Confectionery	.....	40	40
Grain Mill Products	125	170	570
Ice Manufactured	120	.....	260
Meats and Meat Products	.....	140	1,793
Milk Products	349	.....	557
Miscellaneous	545	300	4,254
	$1,632	$875	$10,884

Cottonseed Oil Use Still at High Level

With figures available up to the end of June, it is now apparent that cottonseed oil consumption for the crop year ending July 31, 1938, was in the neighborhood of 4,400,000 bbl. of foreign and domestic oil. Of this, some 4,250,000 bbl. was domestic oil. The carry-over into the new crop year from the 1937 bumper yield is around 1,500,000 bbl. and, even with the curtailed crop of 1938 (likely not to exceed 3,000,000 bbl.) the total domestic oil available for consumption until the new 1939 crop comes in will be somewhat in excess of this year's disappearance.

This 1937-38 consumption of cottonseed oil exceeds that of any previous crop year and, in view of current low stocks of lard, heavy cottonseed oil demand may be expected for several months to come.

Upward Movement Grows Stronger

Rapid advance in the stock market occurred during the three-week period ending July 16. This movement was accompanied by a considerable upward movement in the prices of commodities as a group and, in particular, in prices of most food commodities except grains. Moody's index, at 136 on June 18, rose to 146.3 by July 16. Fisher's index was 81.0 on June 18 and 81.7 on July 16. The *Business Week* index of business activity registered a gain of 1.81 per cent for the period.

Whether or not the performances of these indexes means the beginning of true business recovery, many industrial indicators have also shown improvement. Automobile production rose against the seasonal trend, being 41,970 for the week of June 18 and 42,010 for the week of July 16. Steel production rose almost 10 percentage points in the period, from about 27 to about 36.5 per cent of capacity. Heavy construction awards rose from around $29,000,000 in the June 18 week to over $52,000,000 for the July 16 week. Electric power production also ran somewhat higher at the end of this four-week period.

The United States Department of Labor indexes of wholesale prices for the four weeks ending July 16 showed 0.28 per cent loss for the general index, 0.43 per cent drop for the farm index, and 0.14 per cent gain for the food index. The weekly weighted commodity price indexes of the *New York Journal of Commerce*, in the same period, showed 1.18 per cent gain for the general index, 6.32 per cent drop for the grain index, and 5.77 per cent increase for the food index.

INDICATORS

BUTTER PRODUCTION, May, 1938, was 197,526,000 lb., compared to 179,493,000 lb., in May, 1937, according to the U.S. Dept. of Agriculture.

OLEOMARGARINE SALES in May, 1938, were 29,531,132 lb., compared to 29,726,132 lb. in May, 1937, as represented by tax stamp sales of the Internal Revenue Bureau.

GRAPEFRUIT JUICE canned in Texas, 1937–38 season, totaled 4,700,000 cases, more than double the 2,200,000 cases of the preceding year.

FLOUR PRODUCTION in June, 1938, was 5,357,485 bbl., compared to 4,977,372 bbl. in May, 1938, and 5,250,074 bbl., June, 1937, as reported by *The Northwestern Miller* for mills representing about 60 per cent of U.S. output.

CONFECTIONERY and competitive chocolate product sales, in May, 1938, were $15,365,160, compared to $17,382,000 in May, 1937, a drop of 11.6 per cent, according to the U.S. Dept of Commerce.

QUICK FROZEN VEGETABLES in storage, July 1, 1938, totaled 31,434,000 lb., compared to 7,088,000 lb. on July 1, 1937.

QUICK FROZEN FRUITS in storage, July 1, 1938, totaled 25,360,000 lb.

COLD PACK FRUITS in storage, July 1, 1938, totaled 99,389,000 lb., compared to 77,069,000 lb. on July 1, 1937.

BUTTER, creamery, in storage, July 1, 1938, was 120,050,000 lb., compared to 83,119,000 lb. on the same date in 1937, and a 1933–37 average for the date of 85,971,000 lb.

CHEESE IN STORAGE on July 1, 1938, amounted to 114,722,000 lb., against 105,318,000 lb. the year before.

EGGS, case equivalent, in storage on July 1, 1938, totaled 10,207,000 cases, compared to 13,257,000 cases on July 1, 1937, and a 1933–37 July 1 average of 11,755,000 cases.

POULTRY, frozen, in storage on July 1 of this year was 53,355,000 lb. On July 1 last year the total was 77,173,000 lb., and the 1933–37 average for the date was 50,118,000 lb.

MEAT, all kinds, in storage amounted to 514,375,000 lb. on July 1, 1938, compared to 713,315,000 lb. a year before and a 1933–37 July 1 average of 680,568,000 lb.

LARD IN STORAGE on July 1, 1938, was 126,123,000 lb., compared to 185,124,000 lb. on July 1, 1937, and a 1933–37 average for the date of 151,593,000 lb.

WEEKLY FOOD INDEX of Dun and Bradstreet stood at $2.46 in mid-July, a gain of 5.1 per cent since June 1, 1938.

MEN, JOBS and COMPANIES

INDUSTRY

» AMERICAN REFRIGERATION, INC., will establish at Richmond, Va., a plant for the freezing and storage of foods. Feeder plants will be established at Petersburg, Toano, Front Royal and Alexandria.

» BOOTH FISHERIES CORP. will open branch houses in Amarillo and Lubbock, Tex., and in Albuquerque, N. M. Each branch will do wholesale and retail business.

» CANADIAN SHREDDED WHEAT CO., Niagara Falls, Ont., will build a five-story, 45x180 ft. addition to its plant at a cost of $150,000.

» DEL ROSSI MACARONI CO. plant at Providence, R. I., was damaged by fire July 3, with an estimated loss of $100,000. The plant probably will be rebuilt.

» FLORIDA COAST SEAFOOD CORP., Apalachicola, Fla., is building a $35,000 quick-freezing plant.

» FROSTKRAFT PACKING CORP., San Francisco, which recently began quick-freezing fruits and vegetables, has enlarged its plant and productive facilities for the 1938 pack.

» GENERAL FOODS CORP., New York, has let the contracts for two super-trawlers. The fishing boats will be powered by diesel engines and will cost in excess of $500,000. They are to be equipped with electric hydraulic steering and mechanical refrigeration.

» ALBERT F. GOETZE, INC., Baltimore, will put up a two-story addition to its plant at a cost of $50,000.

» GRIESEDIECK-WESTERN BREWERY CO., Belleville, Ill., is asking stockholders to ratify new financing in the amount of $750,000. Most of the proceeds will be used to expand the plant and install new equipment.

» GUM, INC., has installed air-conditioning equipment in its Philadelphia plant to make possible continuous summer production. The system, a carrier unit, maintains a temperature of 72 deg. and a relative humidity of 50 per cent in the rolling room. In the wrapping department the temperature is kept at 70 deg. and the relative humidity between 45 and 50 per cent.

» HINDS COUNTY (Miss.) board of supervisors has authorized construction of a $40,000 meat curing and refrigeration plant at Raymond Junior College. The plant will provide facilities for preserving the meat produced by Hinds County farmers and also serve as an educational unit.

ALEX R. PETRIE

An executive of Atlantic Biscuit Co., Providence, R.I., he heads up Biscuit & Cracker Manufacturers' Association of America for the coming year. Other officers of the association include E. Y. Crossmore, National Biscuit Co., New York, Hanford Main, Loose-Wiles Biscuit Co., Long Island City, N.Y., and A. P. Streitmann, Streitmann Biscuit Co., Cincinnati, vice-presidents; R. T. Stokes, New York, secretary-treasurer.

» CHARLES E. HIRES CO., Philadelphia, has opened a $250,000 bottling plant in Dallas. A fleet of ten trucks covering a radius of 150 miles will serve the branch.

» HOOD RIVER (Ore.) Apple Growers Association is rebuilding its packing plant, which was destroyed by fire several months ago with a loss of $100,000.

» KELLOGG CO., OF GREAT BRITAIN, LTD., has built at a cost of half a million pounds ($2,465,000) the largest cereal factory in the British Empire. Located at Stretford, Manchester, the plant has a total floor space of 250,000 sq.ft.

» KRAFT-PHENIX CHEESE CORP. recently moved its office force into its new office building in Chicago. Production units are being transferred into the new plant building. Kraft-Phenix recently opened a new cheese factory at Calhoun City, Miss.

» CHARLES A. KRAUSE MILLING CO., Milwaukee, has started operations in its new $1,000,000 plant.

» KRUEGER BREWING CO. recently moved its plant from Asbury Park, N. J., to Neptune City, N. J., providing larger and more modern facilities.

» OLD FORT MILLS, INC., Marion, Ohio, will spend $100,000 to double the capacity of its soybean processing and feed grinding plant.

» B. E. MALING, CHICAGO, has constructed a new frozen foods plant at Hillsboro, Ore.

» OSCAR MAYER & CO. is building a $20,000 addition to its packing plant at Madison, Wis.

FOR PACKERS IN GLASS

General view of new experimental kitchen of Glass Container Association, showing the gas and electric cooking units. Containing the most modern equipment available, the kitchen will be used to foster the packing of food in glass containers. The kitchen is atop a tall building in New York, and some new and effective architectural uses are made of glass in it and the adjacent reception and display rooms.

» MEYER KORNBLUM PACKING CO., Kansas City, Kan., will spend $50,000 to build a two-story 40x120-ft. addition to its plant.

» PALAZZOLO & Co., Cincinnati, will erect a $100,000 factory for the manufacture of Italian paste foods.

» PETER PAUL, INC., Naugatuck, Conn., has increased its operating schedule from 32 to 45 hours a week. Its Philadelphia division, the Collins Co., is entering its third year of continuous operation at 24 hours a day.

» PURITY-WINKELMAN BAKING CO., Memphis, plan to build a 134x63-ft., two-story addition to its plant, to cost $40,000.

» SEATTLE (WASH.) ICE CO. has tripled its capacity for sharp-freezing foods so that it can process 1,000 tons of berries and vegetables a year.

» SPRECKLES SUGAR CO. of California is tentatively planning to construct a large beet sugar factory near Edinburg, Tex. Work on the plant is awaiting successful termination of experiments in growing sugar beets in the lower Rio Grande Valley.

» SPRING VALLEY BUTTER CO., Kansas City, Mo., recently purchased the plant of Cloverdale Creameries, Inc., Houston, Tex.

» SWIFT & Co. is spending $22,500 to construct distributing, storage and refrigerating facilities at Decatur, Ala. The company will operate a number of refrigerated trucks from Decatur to points in northern Alabama.

PERSONNEL

» J. B. ALLEN, Columbia, S. C., has been re-elected president of Piedmont Millers' Association.

» WILBER B. ANTEAU has been made president of Kings Tavern Brewing Co., Flint, Mich.

» J. E. CLOUTER, Montreal, recently was re-elected president of the Province of Quebec Bakers' and Confectioners' Association.

» ANDREW P. CRAIG, Toronto, Ont., has retired as general factory superintendent of Standard Brands, Ltd.

» ARTHUR T. DANHY, president of Danhy Packing Co., Buffalo, has been named to the board of directors of William Simon Brewery to succeed Guy H. Lovelace, who is now sales manager.

» HERBERT H. DROSTE, for 28 years secretary of the James H. Forbes Tea & Coffee Co., has been elected treasurer of the G. S. Suppinger Co., St. Louis.

ARTHUR H. LAUTERBACH

For the past three years manager of Interstate Milk Producers' Association, Philadelphia, he has been appointed general manager of Pure Milk Association, Chicago. He is also president of Northeastern Dairy Conference and formerly was chief of the dairy section of AAA and general manager of National Cheese Producers' Federation.

» HOWARD O. FRYE has advanced from bulk sales manager to general sales manager of Walter Baker & Co., Inc., Dorchester, Mass. Joseph C. Headley was made assistant to Mr. Frye.

» JOHN D. HAYES, former vice-president and general manager of Fanny Farmer Candy Co., Inc., has been promoted to president to succeed Frank P. O'Connor, resigned.

» WILSON H. LEE, New Haven, Conn., has been elected president of Certified Milk Producers' Association of America. Dr. John P. Nuttall, Los Angeles, was named president of American Association of Medical Milk Commissions at a joint meeting of the two associations.

» C. R. MCKENNA, Johnson Biscuit Co., Sioux City, heads up Independent Biscuit Manufacturers Co., Inc., for the coming year. D. F. Bremner, Bremner Bros. Chicago, is vice-president; C. H. Wortz, Wortz Biscuit Co., Fort Smith, Ark., treasurer; H. D. Butler, New York, secretary; M. J. Hogan, Chicago, Western manager; Thomas E. Hollingshead, director of the Technical Institute.

» JOHN W. MCKAY, general manager of Euclid Candy Co., San Francisco, has been made president of the newly organized Euclid Candy Co. of Illinois, which has taken over the lease and equipment of Diament, Inc., Chicago. Production operations began about July 1 on the company's line of 5-cent bars. The Illinois company will distribute its products over a territory extending from Indiana to Wyoming and from Canada to Louisiana.

» EDWARD J. NOBLE, chairman, Life Savers, Inc., Port Chester, N. Y., has been named head of a five-man civil aeronautics authority which will work out a new program for federal regulation of commercial aviation in the United States.

» LEROY PAYNE has been elected president of Eckhardt & Becker Brewing Co., Detroit, succeeding the late William P. Bradley.

» GUDOLPH POVERUD, formerly production manager of Walter Baker & Co., left the company several weeks ago.

» D. E. RINDER, baking technologist of Independent Biscuit Manufacturers Co., Inc., Technical Institute, has joined the sales service staff of Igleheart Bros., Evansville, Ind.

» WILLIAM B. ROSSKAM, Quaker City Chocolate & Confectionery Co., has been elected president of Pennsylvania Confectioners' Association.

» CONRAD SPOHR, formerly candy maker for Walter Burt Candy Co. and A. E. Staley Manufacturing Co., has joined the staff of American Dry Milk Institute to develop candies using dry milk solids.

» L. P. SYMMES, Baker Extract Co., Springfield, Mass., was chosen president of Flavoring Manufacturers' Association of the United States, at the recent convention in Atlantic City. Dr. Clarke E. Davis, Virginia Dare Extracts Co., Brooklyn, John H. Beach, Seeley & Co., Inc., New York, and J. C. Price, Price Extract Co., Chicago, were elected vice-presidents of the association.

» JACK TOD has been elected president and treasurer of Zinsmaster Breads Inc., Des Moines, Mr. Tod also is functioning as general manager of the company. William Z. Proctor was made vice-president and Mrs. Marcellus Zinsmaster was elected secretary. The company is modernizing its bakery and will more than double the capacity.

» GEORGE WALKER, Crown Mills, Portland, Ore., recently was named president of Association of Operative Millers. Other officers elected were Joseph E. Chamberlain, Maple Leaf Milling Co., Ltd., Toronto, vice-president; H. H. Trapp, Russell Miller Milling Co., Minneapolis, treasurer.

DEATHS

» WILLIAM P. BRADLEY, 70, president of Eckhardt & Becker Brewing Co., Detroit, June 29.

» THOMAS L. CHADBOURNE, 66, for several years chairman of an international committee for stabilization of the sugar market, June 15, at New York.

» JOSEPH T. CASTLES, 70, founder of Castles Ice Cream Co., Irvington, N. J., July 9. Mr. Castles was a pioneer in ice cream manufacturing.

» LOUIS E. DENNIG, 78, retired president of St. Louis Independent Packing Co., July 1.

» JAMES GENTLES, 83, founder of Gentles Baking Co., Boston, June 20.

» GEORGE MAX GOTTFRIED, 54, vice-president in charge of sales of Continental Baking Co., New York, July 6, at Baltimore.

» CAPTAIN S. TAYLOR HARRISON, 66, one of the founders of Tilgham (Md.) Packing Co., recently. He had been in the seafood industry 40 years.

» CHARLES W. ISALY, 73, one of the founders Isaly Brothers, June 16, at Columbus, Ohio.

» WILLIAM H. LEASE, 71, founder of Lease Chocolate Co., Cincinnati, July 14.

» D. FRED LEMBRIGHT, 55, general manager of Lembright Bakeries, Alliance, Ohio, June 23.

» BERNHARD LOEFFLER, 69, chief engineer for Christian Feigenspan Brewing Co., Newark, N. J., July 4.

» HENRY NICHOLAUS, 87, president of Hyde Park Brewing Association, St. Louis, June 28.

» ELLERY L. WILSON, 57, vice-president of Rumford Chemical Co., East Providence, R. I., June 26. Mr. Wilson was also a director of the company and plant superintendent.

» HERBERT WILSON, 70, chairman of the board of Buckeye Brewing Co., Toledo, June 15.

ASSOCIATED INDUSTRIES

» AMERICAN MACHINE & FOUNDRY Co. has built an addition to its oven plant at New Haven, Conn.

» CELLULOID CORP. has transferred its New England headquarters from Worcester to Leominister, Mass.

» INTERNATIONAL NICKEL CO., INC., has established a new field office in Pittsburgh under the direction of H. V. Beasley.

» OAKITE PRODUCTS, INC., has transferred A. C. Daly from Wilmington, Del., to the Hartford, Conn., territory. J. J. Maguire takes over the Wilmington territory.

» PFAUDLER CO., Rochester, N. Y., has completed a new alloy fabricating shop in Elyria, Ohio, and has set up an alloy division to handle the fabrication of alloy processing equipment.

» REPUBLIC STEEL CORP. has appointed Union Hardware & Metal Co., Los Angeles, as a distributor.

» WORTHINGTON PUMP & MACHINERY CORP. has transferred William J. Daly from Detroit to its Philadelphia office.

» WILSON & BENNETT MFG. CO. has established a new steel drum manufacturing plant at Port Arthur, Tex.

In one plant we know it cost only 18/100 of a CENT per BARREL to eliminate this costly pest

This flour producer has overcome his losses from insect infestation by fumigating his plant with LIQUID HCN four times a year. When this 2500-barrel mill operates at capacity for 200 days a year, the annual cost is only 18/100 cent per barrel — an insignificant expenditure to effect great savings.

Another food company, producing prepared cake and flour mixtures, uses HCN in its vacuum chamber fumigation. The chamber is loaded with 40,000 pounds of packaged product at a time.

In this plant a complete kill of all insects and their larvae is obtained at a cost of 15/1000 cent per pound of packaged product.

Neither of these two companies has sustained losses from insect infestation nor have there been returns on insect-infested products.

If you handle flour, rice, raisins, dates, figs, nuts, cacao, or other food products subject to insect infestation, why not write us for an estimate of the cost of obtaining a complete kill of destructive pests.

LIQUID HCN is an all-purpose pest destroyer. It is a powerful, concentrated, economical and efficient fumigant, completely controls all insects which infest stored products, and kills rats and mice.

As manufacturer of HCN in all its modern forms—including LIQUID HCN (commercially pure), ZYKLON DISCOIDS, CALCYANIDE and CYANOGAS—American Cyanamid is able to render a complete and valuable service.

AMERICAN CYANAMID & CHEMICAL CORPORATION
Insecticide Department
30 ROCKEFELLER PLAZA, NEW YORK, N. Y.
KANSAS CITY MO. AZUSA, CALIF.

Sterilized Spices

(*Continued from page 425*)

Considerable work has been done with various volatile organic compounds for the fumigation of food materials against grain weevil infestation.[10] Methyl formate in combination with CO_2 and methyl bromide with CO_2 have been recommended as being effective against insect infestation in food fumigation.[11] Ethylene oxide, and mixtures of it with CO_2, have been investigated and suggested as effective fumigants for some food materials.[12, 13, 14, 15, 16, 17] Also various processes have been worked out and are being used effectively for destroying insect pests and fumigating food products through the use of these gases.[18, 19, 20] Use of ethylene oxide has been proposed for

Table VI (a)—Micro-organism Reduction in Spices and Flours by Ethylene Oxide–CO_2 Treatment.[1]

(Average results obtained from more than 100 tests made in two years.)

Sample	*Untreated, count per gram*	*Treated, count per gram*	*Kill, per cent*
Whole red pepper	1,500,000	1,400,000	6.67
Wheat flour	13,000	2,000	84.60
Corn flour (fine processed)	5,000	1,400	72.00

[1] Retorted for 2½ hr. at 70–80 deg. F. in 176 cu. ft. chamber containing 10 lb. of 10-per cent ethylene oxide and 90-per cent CO_2 mixture. Charge in retort: 1,000 lb. pepper in burlap bags, 140-lb. bag wheat flour and 140-lb. bag corn flour.

Table VI (b)—Micro-organism Reduction in Spices and Flours by Ethylene Oxide–CO_2 Treatment.[1]

(Average results obtained from more than 100 tests made in two years.)

Sample	*Untreated, count per gram*	*Treated, count per gram*	*Kill, per cent*
Ground paprika	885,000	180,000	79.66
Corn flour	18,000	14,600	18.89
Ground coriander	23,000	19,300	16.09
Black papper			
(a) At back of retort	2,770,000	2,580,000	6.86
(b) At front of retort	2,370,000	2,270,000	4.21

[1] Retorted for 3 hr. at 70–80 deg. F.—other conditions as given in Table VI (a). Charge in retort: 1,080 lb. pepper in burlap bags, 140-lb. bag paprika, 140-lb. bag corn flour, and 140-lb. bag coriander.

Table VI (c)—Micro-organism Reduction in Spices by Ethylene Oxide–CO_2 Treatment.[1]

(Average results obtained from more than 100 tests made in two years.)

Spice	*Untreated, count per gram*	*Treated, count per gram*	*Kill, per cent*
Whole black pepper	2,570,000	621,000	75.84
Ground paprika	420,000	110,000	73.81
Ground red pepper	2,550,000	.....	.....
(a) Top of bag	.....	1,320,000	48.24
(b) Bottom of bag	.....	1,600,000	37.26
Whole red pepper	140,000	3,000	97.86

[1] Retorted at 165 deg. F.—other conditions as given in Table VI (a). Charge in retort: 100-lb. burlap bag of paprika, four 140-lb. burlap bags whole black pepper, 40-lb. paper bag ground red pepper, and 25-lb. paper bag whole red pepper.

Table VII (a) — Micro-organism Reduction in Spices by Ethylene Oxide Treatment.[1]

(Average results obtained from more than 100 tests made in two years.)

Spice	*Untreated, count per gram*	*Treated, Count per gram*	*Kill per cent*
Ground red pepper	1,350,000	30,600	97.73
Black pepper hulls	6,400,000	249,000	96.10
Ground paprika	670,000	30,650	95.43
Whole black pepper	2,600,000	355,000	86.30

[1] Heated at 220 deg. F. for 1 hr. in steam-jacketed, 35.64-cu. ft., cylindrical chamber under an 18-in. vacuum, cooled to about 150 deg. F. with vacuum increasing to 28 in. of mercury subjected to ethylene oxide (1 lb. to 35 cu. ft. evacuated space) for 2½ hr. under vacuum reduced to 24 in. of mercury. Charge in retort: 40-lb. cloth bag red pepper, 40-lb. cloth bag black pepper hulls, 100-lb. burlap bag paprika, and four 140-lb. burlap bags whole black pepper.

GUARDITE *Processing Units*

KILL BACTERIA

(Mold and Flat Sour Thermophiles)

● Mold and flat sour thermophiles are directly responsible for the spoilage of many food products. This spoilage causes loss of raw materials, entails unnecessary distribution expenses and may endanger dealer and consumer good will. A recognized laboratory and a leading University report that the new Guardite processing unit, utilizing Guardite gas containing ethylene oxide, kills all the sour thermophilic bacteria and, in many cases, gives complete sterilization of dry food products. Spices, flour and other products may be treated without affecting the color, taste or odor. You can increase your profits and consumer good will by reducing mold and wild yeast bacteria in your product. Write the Guardite Corporation, Chicago, Ill., for facts.

Guardite unit at the McCormick & Company, Inc., spice plant at Baltimore, Md.

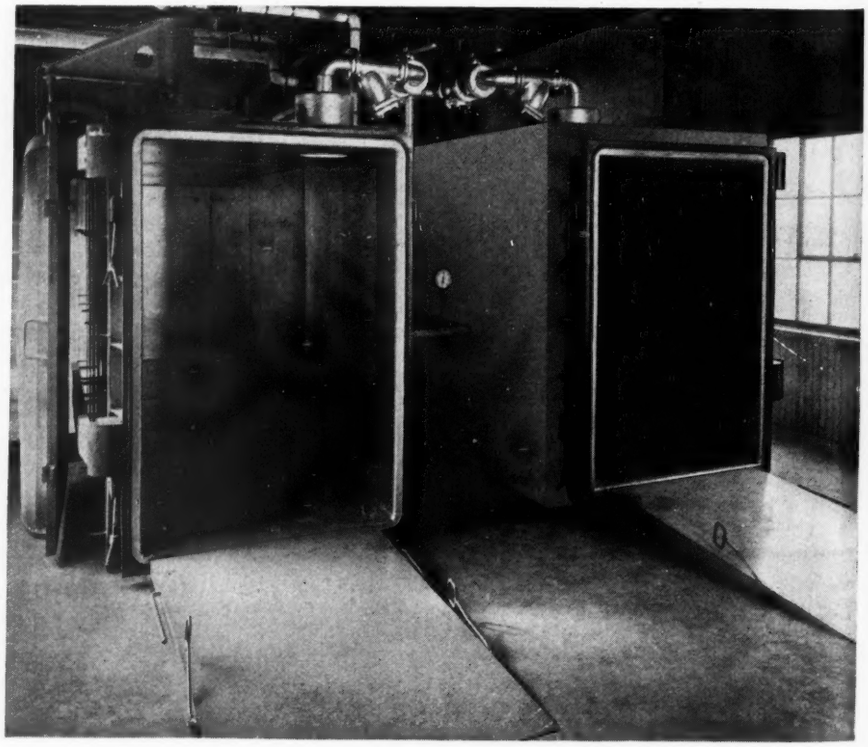


Table VII (b)—Micro-organism Reduction in Spices by Ethylene Oxide Treatment.[1]

(Average results obtained from more than 100 tests made in two years.)

Spice	Untreated, count per gram	Treated, count per gram	Kill, per cent	Untreated, mold count	Treated, mold count	Kill, per cent
Ground black pepper.	2,600,000	22,000	99.15	90	0	100.0
Ground red pepper..	3,400,000	17,000	99.50	2,500	20	99.2
Whole black pepper..	6,400,000	5,000	99.92	310	0	100.0

[1] Heated at not over 220 deg. F. for 1 hr. in a steam-jacketed 35.64-cu. ft. cylindrical chamber under an 18-in. vacuum, cooled to about 150 deg. F. with vacuum increasing to 28 in. of mercury, subjected to ethylene oxide (1 lb. to 35 cu. ft. evacuated space) for 2½ hr. under vacuum reduced to 24 in. of mercury. Charge in retort: 25-lb. cloth bag red pepper, 25-lb. cloth bag ground black pepper and six 140-lb. burlap bags whole black pepper.

Table VIII—Micro-organism Reduction in Spices by Ethylene Oxide Treatment.[1]

(Average results obtained from more than 100 tests made in two years.)

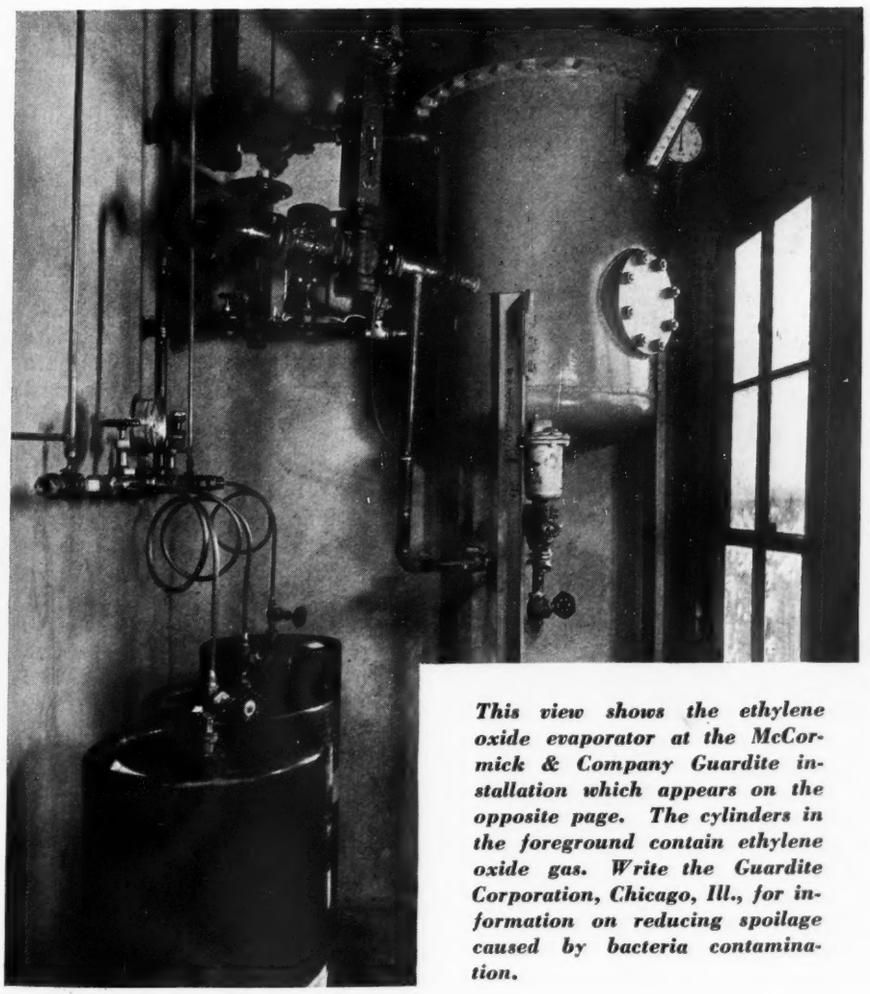
Spice	Treatment, time	Untreated, count per gram	Treated, count per gram	Kill, per cent
Ground red pepper.....	15 min.	1,850,000	570,350	69.0
Ground red pepper.....	45 min.	1,850,000	357,050	80.7
Ground red pepper.....	60 min.	1,850,000	139,875	92.5
Ground red pepper.....	3 hr.	1,850,000	64,750	96.5
Ground paprika.....	17 hr.	670,000	12,730	98.1
Ground black pepper.....	2 hr.	2,600,000	303,000	88.3
Ground paprika.....	2 hr.	670,000	56,000	91.6

[1] Held at 70 deg. F. in 35.64-cu. ft. cylindrical chamber under 28-in. vacuum until introduction of ethylene oxide (1 lb. to 35 cu. ft. evacuated space) when vacuum falls to 24 in. of mercury for the given period of treatment.

GUARDITE *Processing Units*

RETAIN COLOR, TASTE, ODOR!

● The Guardite process operates at normal temperature, consequently you can get a definite reduction in bacteria and at the same time retain those valuable elements—color, taste and odor—in your product. At atmospheric temperatures the volatiles are not driven off, all delicate flavors being retained. A Guardite unit is inexpensive to operate, and entirely automatic.



This view shows the ethylene oxide evaporator at the McCormick & Company Guardite installation which appears on the opposite page. The cylinders in the foreground contain ethylene oxide gas. Write the Guardite Corporation, Chicago, Ill., for information on reducing spoilage caused by bacteria contamination.

the control of "rope" bacteria and of mold in bakery products, particularly in bread.[21]

Contrasted with these chemical methods of treating foods for the reduction of insect infestation and micro-organism contamination is the relatively recent use of a new type ultra-violet lamp which gives off radiant energy of a particular wave length.[22] Irradiation, though reputed to be germicidal to mold and bacteria, appears to be only partially effective for the sterilization of spices on a commercial basis. Caution has been voiced as to the germicidal effectiveness of ultra-violet lamps; their virtues should not be over-estimated and their application is bounded by distinct limitations.[23]

Freeing vegetable materials of their micro-organism contamination by a process based upon the use of ethylene oxide in the presence of moisture depends upon the production of ethylene glycol.[24]

Recently reported work on the sterilization of spices by treatment with heat, ethylene oxide, formaldehyde, ethyl formate and ether indicates that sterilization by heat varies in its efficiency and that there is a 10 per cent loss in the spice strength; that ethyl formate is only moderately effective; that ether is ineffective; that formaldehyde is effective but impractical; and that ethylene oxide is highly effective.[25]

In studying the problem of spice contamination most workers have failed to distinguish between fumigation and sterilization. Generally, fumigation indicates primarily the destruction of insect life and not the destruction of micro-organisms such as bacteria and molds. In carrying out a fumigating procedure, fumigation and partial sterilization often occur simultaneously. But, at the present, methods of fumigation and sterilization using mixtures of ethylene oxide and CO_2 are inadequate for spice sterilization. Bacteria and molds are not killed in sufficient quantities for the methods to be commer-

cially satisfactory. (Tables VI (a), (b), (c).

On the other hand, the United States Patent Office has granted a patent[28] covering a process in which undiluted ethylene oxide is used safely, economically, and effectively for a 95 to 100 per cent sterilization of spices without injuriously affecting their physical properties or materially lessening their spice strength.

The basic principle of this process is to impregnate the material treated, whether it be spices or other vegetable materials, with ethylene oxide at a sufficiently toxic concentration to reduce or to destroy the bacteria, yeast and mold spore content of the material. The material is prepared for the impregnation by first subjecting it to a safe heat under vacuum. (Tables VII (a) and (b), and VIII).

While the temperature at which the treatment is carried out appears to have some part in the effectiveness of the process, the first stage heating, application of 18-in. vacuum, and cooling with resultant increase in vacuum to 28 in. of mercury appear to be the predominant factors in the effectiveness of this method of using ethylene oxide as a bactericide.

This preliminary treatment of the material to be subjected to ethylene oxide at the concentration of 1 lb. to 35 cu.ft. of evacuated space frees the surface and inter-cellular spaces from adsorbed and absorbed gases and moisture to the point that the ethylene oxide can come in direct contact with the micro-organism contaminants even to the point of possibly penetrating the cell walls of the micro-organism spores themselves.

It is believed that the preliminary heating results in a short activation period for the spore or dormant forms of the micro-organisms, and that subsequent steps in the treatment leaves them in an exposed and weakened condition which makes them susceptible to the toxicity of the ethylene oxide. At least, studies made in connection with the use of undiluted ethylene oxide as a bactericide indicates that effective results are obtained only when there is a coordination of a definite time period of exposure, a definite temperature and vacuum-application cycle, and a definite concentration of ethylene oxide. The limits within which these coordinating factors operate effectively have to be determined to assure sterilization of the various types of materials treated without injurious effect upon the appearance, flavor and other characteristic properties of the materials treated.

In spices, the spice potency, as well as appearance, is the important quality that has to be protected. Studies have shown that practically any ground spice may be heated at 220-240 deg. F. under vacuum for a period of a few hours without loss of more than one per cent of volatile oils. However, this treatment in itself is not sufficient to result in sterilization, especially when the spice is dry. Introduction of the ethylene oxide into the heating chamber, while the spices are still under vacuum and at the desired temperature, results in a condition that produces a high percentage destruction of the micro-organism contamination.

The success with which this ethylene-oxide treatment of spices under vacuum has been proved industrially is evidenced by a daily production of more than 4,000 lb. of spices and other vegetable materials under exacting bacteriological control.

Repeated tests have indicated no ethylene oxide residue in the treated

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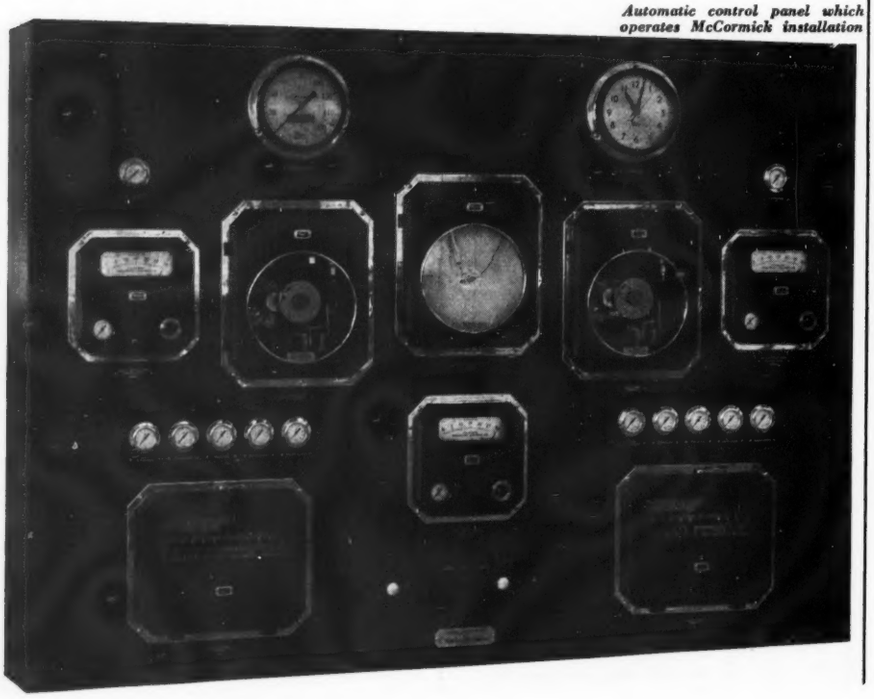
ENTIRELY AUTOMATIC!

● These units are entirely automatic and "fool proof". The controls are locked and can be started only by the technicians entrusted with the key. When unlocked, the process is started by pushing just one button. In addition to being completely automatic a complete record is made of each charge.

The chemical used (ethylene oxide) is economical, and the power cost negligible. Write the Guardite Corporation, for information on this efficient method of reducing spoilage from mold and thermophiles.

Automatic control panel which operates McCormick installation



products regardless of their particle size or oil content. Control laboratory tests have very definitely indicated the absence of both aerobic and anaerobic bacteria.

By such treatment, spices and other vegetable ingredients used in food manufacture and processing may be freed from their potentially harmful micro-organism contamination and made to afford another means by which food manufacturers and processors may exercise a positive control over the quality of their finished products.

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Spice Flavoring

(*Continued from page 427*)

fine flavor of ice cream made with vanilla extract. All that had to be done was to draw an analogy between vanilla and spices. Vanillin, the principal flavor of vanilla beans, corresponds to the essential oils, the principal flavoring constituents, of the spices. Vanilla extract supplied the answer to the spice problem: Percolate and extract the flavors of spices.

Of course, that is not quite as simple as it sounds, and it took a lot of work to determine the most suitable solvent and the best temperature for extraction to get yield and to preserve the natural fine character of the flavor. Then how to evaporate the solvent and retain these flavors? How to handle the extracted substances which often are entirely resinous and of a viscous consistency?

One step was certain. Natural spice and herb materials containing the highest content of extractable flavor properties obtainable at industrial prices had to be used to make the extraction process economically possible.

The operating details covering the other steps had to be determined by a long series of experiments under close laboratory control until the conditions under which the best results are obtained became established.

Each spice and herb has its own set of conditions under which the percolation and recovery of the extract are carried out. Even the same solvent is not usable for all materials, nor can all of them be ground to the same screen fineness to get best extraction.

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Increase the *Quality* of Your Product!

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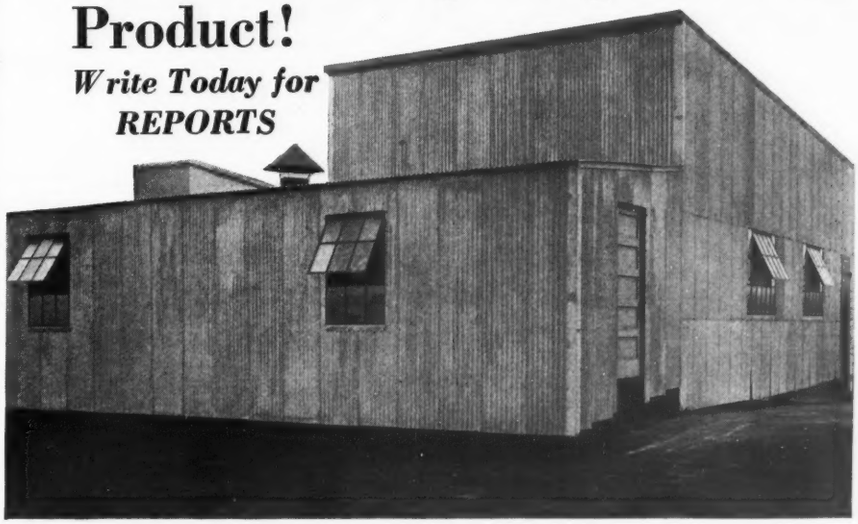

Penthouse on roof of McCormick plant housing complete Guardite unit.

● If you manufacture canned goods, condiments or similar products you can reduce mold and wild yeast bacteria and prevent the spoilage they cause. If your product is an ingredient of other foods, your customer is constantly analyzing it. The Guardite process will assure its meeting his specifications at all times.

The Guardite process is effective. The cost of operating a unit is small. The original color, taste and odor of your product is retained. The equipment is designed, built and installed by the pioneers in vacuum fumigating, sterilizing and tempering apparatus.

Write for reports by a recognized laboratory and a leading University on the effectiveness of this new Guardite apparatus. There is no obligation and your inquiry will be held in confidence.

GUARDITE CORPORATION

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However, all the materials ground to the desired mesh, are weighed into porous cotton bags and placed on perforated trays in vapor-tight percolators made with a non-corrosive inner surface.

When the system is closed, the solvent, heated to a moderate temperature is pumped in as a spray at the top and circulated in contact with the spice or herb until all the flavor is dissolved. The solution is then filtered and subjected to vacuum evaporation for removal of the solvent leaving the extractives as a residue.

This residue contains the flavor and such color substances as are soluble in the solvent under the conditions followed. It is usually a heavy viscous fluid. Often it has a resinous form that would be difficult to use in a food manufacturing plant because of its concentration and sticky state.

To offset this difficulty, edible carriers such as refined corn sugar or salt are mixed and finely ground with a standardized flavor concentration of these extractives.[1]

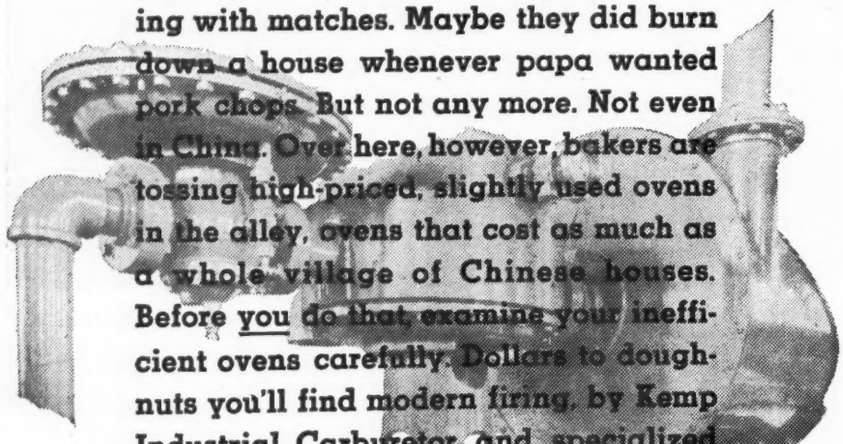
The net result is that the flavoring or seasoning constituents of the spices or herbs have been transferred from an insoluble, fibrous—and often contaminated carrier—to a soluble and a complementary taste-imparting one. However, the transfer is made in such a way that the finished flavoring or seasoning mixture carries a known and standardized strength or seasoning power.

This standardization has been made possible through the adoption of a flavor and strength standard for each spice or herb. The standard is an arbitrary one, to be sure, but it is a working standard and it can be adhered to which was not possible in the case of whole or ground spices and herbs.

The first of these soluble seasonings or spice concentrates, that of pepper, became available about seven years ago. During the intervening years additions have been made to the list until at present the full line of spice and herb flavorings or seasonings used in the United States and in Europe are being made in the standardized state.

Further study of the spice and herb flavoring or seasoning problem may yet lead to newer methods and to the placing of still more convenient and more highly standardized forms of them on the market. Technical workers are directing more and more of their research investigations to that end.

BURN DOWN A HOUSE TO *Roast a Pig?*



Maybe the Chinese did discover roast pig because somebody's baby was playing with matches. Maybe they did burn down a house whenever papa wanted pork chops. But not any more. Not even in China. Over here, however, bakers are tossing high-priced, slightly used ovens in the alley, ovens that cost as much as a whole village of Chinese houses. Before you do that examine your inefficient ovens carefully. Dollars to doughnuts you'll find modern firing, by Kemp Industrial Carburetor and specialized Kemp burner equipment will give you modern ovens with production rate and operation economy well in line.

Write today for details on oven modernizing. Let us show you how to get new oven efficiency at a fraction the cost. Address The C. M. Kemp Mfg. Co., 405 E. Oliver Street, Baltimore, Md.

KEMP of BALTIMORE

Microbial Content of Spices

(*Continued from page 429*)

These preliminary results indicate what may be expected of the effectiveness of the ethylene oxide treatment. Not only in the manufacture of spices, but also in the treatment of leathers, fabrics and a wide variety of packaged goods this cold, dry, penetrating process of sterilization will be watched with great interest.

Spice Fumigation

(*Continued from page 431*)

These data were in part the basis on which McCormick & Co. decided to install equipment to apply this process commercially. Experience with similar apparatus for insect control proves that the cost for this processing need not be excessive. The engineers and scientists of this company expect to present in FOOD INDUSTRIES a report on their investigations as soon as convincing and interesting results can be summarized.

Food and Drug Law

(*Continued from page 433*)

the dosage, or with the frequency or duration prescribed, recommended or suggested in the labeling [sec. 502(j)].

The prohibition against the introduction of new drugs before an application for such introduction becomes effective [sec. 505].

The prohibition against cosmetics which may be injurious to users under the conditions of use prescribed in the labeling or under such conditions as are customary or usual [sec. 601(a)]. However, poisonous coal-tar hair dyes which would be exempted under the proviso of this requirement if they bore the warning label prescribed by the statute, will not be subject to action by reason of their failure to bear the prescribed warning until 90 days after the date of approval.

Blanching

(*Continued from page 436*)

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Cold Storage Facilities

(*Continued from page 439*)

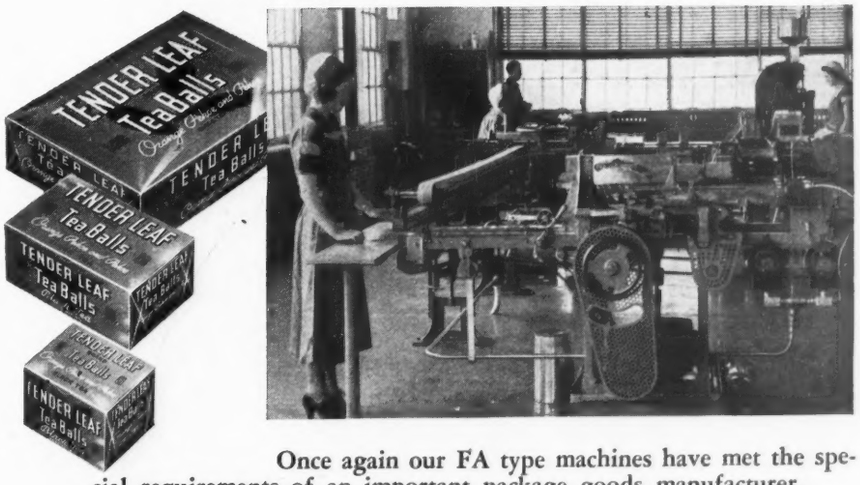
day play a part in quick frozen food distribution, they do not do so now. Table VIII furnishes statistics on total cold storage warehousing. Use the factor 30 lb. per cu.ft. for estimating approximate packaged frozen food capacity.

Whether using public, private or other low temperature storage, the owner of frozen food products, either manufacturer or distributor, should exercise control over his product in the warehouse. This control within the warehouse should include choice of location (with respect to openings which might admit drafts), arrangement in the alloted space, stacking, and above all temperature control.

There are two other cold storage units employed for storage of quick-frozen foods. A few old line grocery product wholesalers are installing their own holding rooms in their own warehouses. The profitableness of this plan depends largely on volume. Few old line grocers have as yet such volume.

The last type of storage unit used for storage of quick frozen foods is the hardening room of the ice cream plant. This type of quick-frozen food warehouse will be discussed in Part II of this article in the September issue of Food Industries.

Selected by STANDARD BRANDS to wrap their new TEA BALL packages



Once again our FA type machines have met the special requirements of an important package goods manufacturer.

Standard Brands' new Tender Leaf Tea Balls are sold in three different sizes of packages. All three sizes are "Cellophane"-wrapped on a single FA machine. Changes from one size package to another are quickly and easily made by simple hand-wheel adjustments. And the wrapping machines are fed automatically from the carton-sealing machines. Utmost efficiency throughout.

The *appearance* of the package is in keeping with the quality of the product. The neat, tightly sealed "Cellophane" wrap produced by our machines fittingly complements the fine design and color combinations achieved in these packages.

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Today *low* costs are essential. Competition also demands strong selling features in your package. We can help you secure both of these advantages. Consult us—as so many other leading package goods manufacturers do.

Get in touch with our nearest office

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Mexico, D. F., Apartado 2303 Buenos Aires: Argentina: David H. Orton, Paipu 231

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

(*Continued from page 450*)

an oil or fat (70 parts) is treated with 1.5 to 2 parts of a potent emulsifying agent, such as a polymer or oxidation product of an oil containing linoleic or linolenic acid. The oil is then emulsified with 30 parts of water (containing salts in solution) or skim milk in admixture with oil or fat and an emulsifying agent. The product is a stable water-in-oil emulsion. An example which illustrates the use of this product as shortening is the preparation of 2,805 parts of dough from 1,000 parts milk, 1,700 parts flour, 60 parts yeast, 15 parts salt and 30 parts the foregoing emulsion.

BEVERAGES

Filtering Fruit Juices

KIESELGUHR (diatomaceous earth) is a particularly useful filter medium for large scale clarification of fruit juices. The best effect is obtained, with greatest operating efficiency, by using the kieselguhr in filter presses under applied pressure. Good results are also obtained by the sedimentation method. Juices intended for production of liqueurs may be pressed from the fruit, filtered twice through kieselguhr and blended as desired to make the intended product.

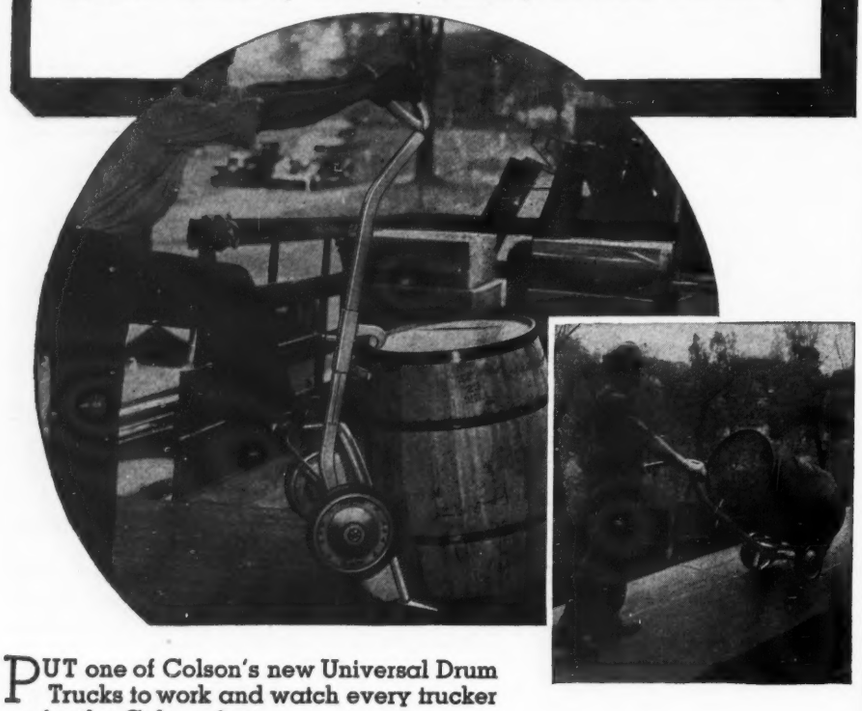
The matter of flavor is important, and in this respect kieselguhr is variable in its performance. The raw, untreated earth cannot be fully relied upon to preserve the fruit-flavors unimpaired, but a well purified kieselguhr can be used in these delicate filtrations without any risk of flavor contamination. In particular, the refined earth does not impart any earthy taste to liquids passing through it. In connection with the modern practice of sterilizing beverage liquids by passage through degerminating filters, instead of by pasteurizing, kieselguhr is useful as a medium for preliminary filtration to prepare fruit juices for the sterilizing filters.

Digest from "Experimental Filtration of Fruit Juices With Kieselguhr," by H. Wustenfeld, *Deutsche Destillateur-Zeitung* 58, 139, 144, 1937 (Published in Germany).

HERE'S YOUR ANSWER

for safe, easy handling of barrels and drums with

LESS WORK, LESS WEAR, MORE SPEED



PUT one of Colson's new Universal Drum Trucks to work and watch every trucker go for the Colson *first.*

Here's a truck that provides the fastest, safest means of handling any barrel or drum. No lifting is required, either in loading or unloading. Operator maintains balance only and pushes the truck. Load is carried over the wheels.

Rugged, all steel welded construction gives you a truck able to stand up under hard, continuous use. Wheels are ball bearing, steel or rubber tired. The hook can be adjusted instantly and set for barrels or drums 24 to 40 inches in height. Handles are shaped to protect the operator at all times. Write for complete specifications.

THE COLSON CORP.

ELYRIA, OHIO

DAIRY PRODUCTS

Milk Irradiated With Lessened Flavor Injury

THAT ULTRA VIOLET RAYS striking surfaces of milk or liquid milk products at an oblique instead of at a right angle are equally effective in irradiation without the development of a disagreeable flavor or odor is claimed in U.S. Patent No. 2,104,681.

According to the studies of the patentee, George C. Supplee, Bainbridge, N.Y., light or other radiant energy causes varying effects when striking substances at differing angles. In the case of milk, light beams whose central axes strike the milk at angles varying from 90 deg. to 15 deg. from the horizontal give the same antirachitic properties to the milk but quite different taste and odor properties. The taste and odor properties are best when at least 85 per cent of the ultraviolet rays strike the milk surface at angles between 15 to 60 deg. from the parallel. When the milk film has a curved surface the angles are measured from a plane tangent to the milk surface.

To get these desired results the milk or liquid milk products may be caused to flow so that one source of ultraviolet rays will irradiate one or several films at a time. While no claims are

made in the patent to cover the design of the equipment used, several sketches are shown illustrating various forms that the film-forming surfaces may have.

One-half of the patent rights are assigned to Borden Co., New York, N.Y., and one-half to National Carbon Co., Inc., Cleveland, Ohio.

FATS & OILS

Olive Oil in Lubricants

OLIVE OIL PRODUCERS are finding a profitable outlet for the low-grade residual oil extracted from marc after expressing the best table oil. As an ingredient in compounded lubricants, this cheap olive oil can more than treble the useful service life of crank case lubricant, and has other merits such as easy starting of the engine, excellent lubricity and favorable viscosity relations. The oil must be strictly acid-free, a requirement which is easily met by neutralizing if the oil is found to have an acid reaction.

Already the use of at least 20 per cent of Tunisian olive oil in motor lubricating oil is compulsory in Tunis, and other producing countries are actively encouraging the use of blended lubricants containing olive oil. The mineral oil industry has seen this threat of competition and has made some efforts to ward off the danger. In reality, however, olive oil of lubricant grade should be welcomed by the petroleum industry as a helpful auxiliary raw material, not as a serious competitor, since world production will always be relatively small. One reason for the superior behavior of olive oil is that all its molecules are active, whereas a hydrocarbon lubricant has to carry the burden of a considerable proportion of inactive molecules. Part of the long service life of blended oils is due to the resistance of olive oil to carbonization in the engine.

Digest from "Olive Oil in Motor Lubricants," by A. Rolet, *Matieres Grasses*, 30, 2, 1938. (Published in France.)

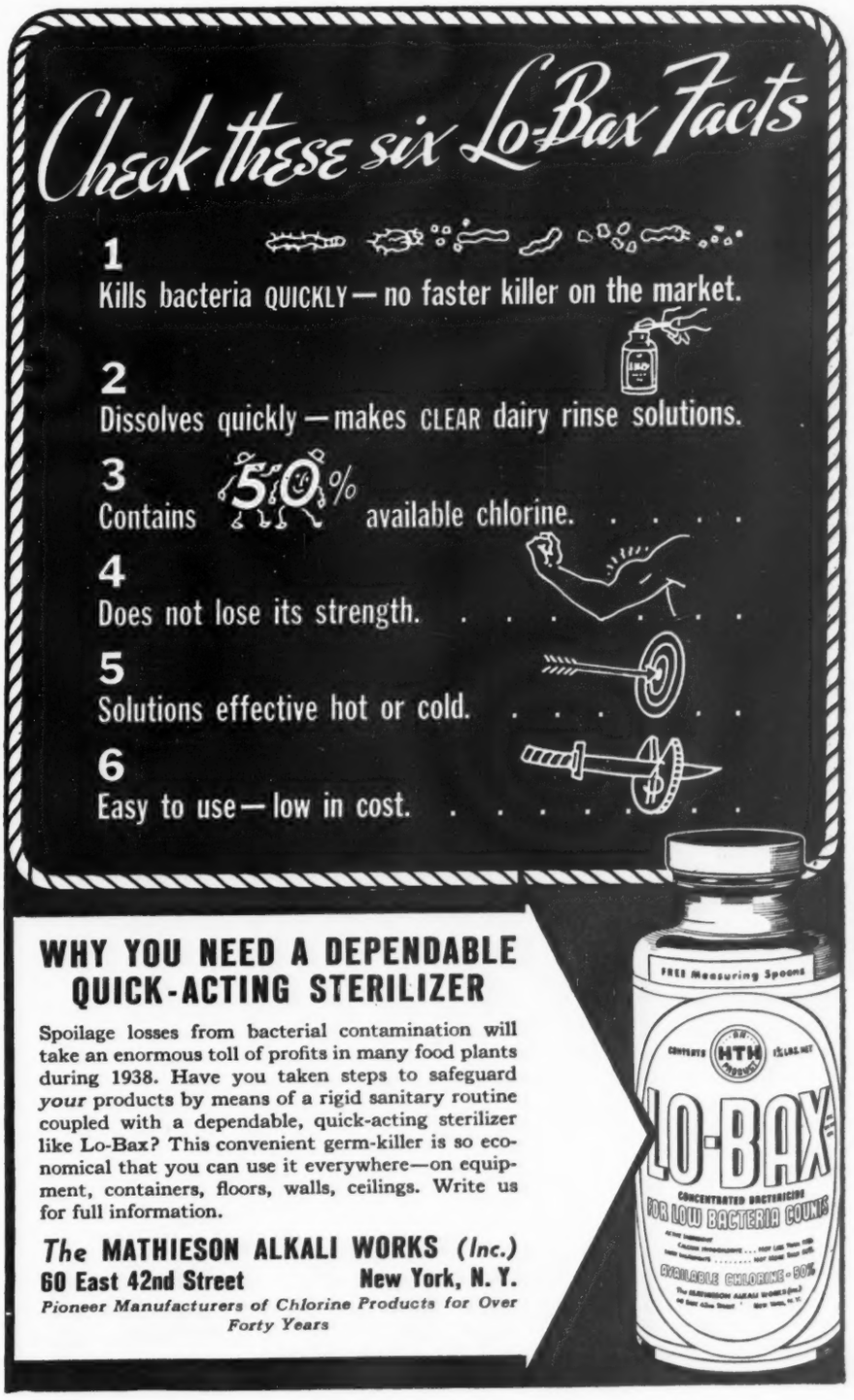
MEATS

Rapid Chemical Meat Inspection

AMONG the several chemical indications of quality in meat products, the ratio of water to protein is useful in several ways. For example, in the examination of sausages if this ratio deviates by more than 0.1 or 0.2 unit from the accepted standard for the particular variety of sausage under inspection there is cause to suspect adulteration. Since casein, skim milk powder and glucose (syrup) are the commonest adulterants, the problem of final proof is much simplified. If the calcium content is high, casein is present; much lactose means milk powder; a high glucose content betrays the use of syrup.

Again, introduction of the water: protein ratio as an indication of quality has helped to clarify the relations between fat and other components of meat. It provides a more definite and precise concept than that of "non-fatty organic matter," which is not necessarily the same as protein in meat products.

Though the idea of the water: protein ratio is by no means new, it has not been readily adopted because the method of determination is somewhat difficult and very tedious in products with high fat content. The nitrogen determination was the point of difficulty, taking too much time and


Check these six Lo-Bax Facts
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Kills bacteria QUICKLY—no faster killer on the market.
2
Dissolves quickly—makes CLEAR dairy rinse solutions.
3
Contains 50% available chlorine.
4
Does not lose its strength.
5
Solutions effective hot or cold.
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Easy to use—low in cost.
WHY YOU NEED A DEPENDABLE QUICK-ACTING STERILIZER
Spoilage losses from bacterial contamination will take an enormous toll of profits in many food plants during 1938. Have you taken steps to safeguard your products by means of a rigid sanitary routine coupled with a dependable, quick-acting sterilizer like Lo-Bax? This convenient germ-killer is so economical that you can use it everywhere—on equipment, containers, floors, walls, ceilings. Write us for full information.
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often requiring several hours for quantitative decomposition of the organic matter. By accelerating this reaction with a small addition of selenium to the reagent, the method has been speeded up to a matter of minutes (as much as 35 minutes when high fat content demands a large sample). With this new expedient for rapid analysis the water: protein ratio can be utilized to the utmost in meat inspection.

Digest from "Rapid Determination of the Water:Protein Ratio in Meat Products," by H. Kalshover, *Chemisch Weekblad* 35, 236, 1938. (Published in Holland.)

PICKLING

Good Cucumber Seed from Nubs and Crooks

FACTORS other than the source of seed are responsible for the production of nubs and crooks. This was determined after two years of tests in which 13,773 cucumbers were considered. Where vines are bearing heavily, a high percentage of well formed cukes may be expected. The popular notion that seedsmen ought to discard all seed from nubs and crooks seems to be out.

Digest from "Does Seed from Nubbins and Crooks Produce a Higher Percentage of Misshaped Fruits than Seed from Straight, Well Formed Cucumbers?" by H. L. Seaton. Read at *Conference on Pickling*, Mich. State College, Feb. 23–25, 1938.

VITAMINS

Variations in Vitamin C Content Of Different Varieties

WATERMELONS varied from 2.7 to 9.5 milligrams of ascorbic acid (Vitamin C) in nine varieties; 30 to 46 mg. ascorbic acid in five varieties of oranges; 11 to 44 in six varieties of lemons; and 7.3 to 37. in seven varieties of canteloupes.

Digest from "Vitamin C Content of Some Texas Fruits and Vegetables," by W. W. Floyd and G. S. Fraps. Presented at Dallas meeting of American Chemical Society.

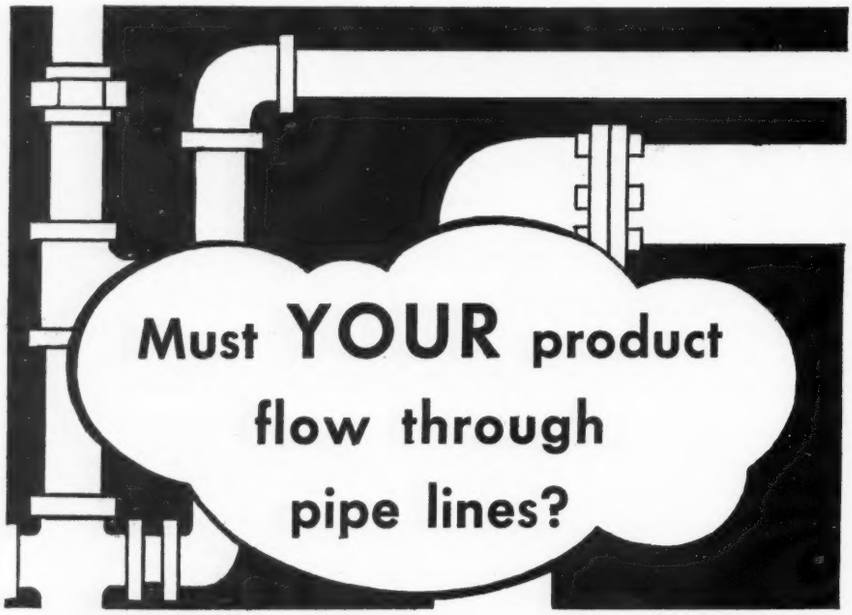
MISCELLANEOUS

Wild Starches

STARCHES from wild plants have received much less attention than those from staple crop plants, but they have a great deal of theoretical and practical importance. For the sake of more exact information a comparative study has been made of starches from arum, tulip, fritillary, crocus, iris and several less common plants. Arum and crocus starches were among the finest in grain size, while tulip and fritillary starches were coarsest.

In the coarse and medium starches ash content was directly, and in the fine starches inversely, proportional to the content of amylopectin. Moisture content, and in most cases also the gelatinization temperature, depends directly on the amylose content. Specific gravity depends chiefly on amylopectin content. None of these properties was found to be related in any way to grain size. Ease of hydrolysis, on the other hand, depends on grain size in that the finer starches are hydroloyzed more rapidly than the coarse, with iris starch offering an exception to the rule.

Gelatinization temperature is also a factor in the hydrolysis behavior of starches. If it is lower than or equal to the hydrolysis temperature the starch hydrolyzes more readily than if the gelatinization temperature is above the hydrolysis temperature. Another



If so, then you know the necessity and importance of protecting product flavor and quality by careful attention to cleaning these pipe lines. In plants using Oakite materials, the cleaning of pipe lines is accomplished easily, effectively and economically by simply pumping and circulating the recommended Oakite solution through lines, then rinsing. Where sanitary piping has been installed, cleaning and sterilizing disassembled piping and fittings the quick, thorough Oakite way is an assurance of maintaining the highest sanitary standards day in and day out.

This is of interest to concerns who can or bottle

FRUIT JUICES
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Our 30 years' successful experience helping food plants improve cleaning and sterilizing practice is at your service.

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rule is that starches with high amylopectin content are easier to hydrolyse than those with low amylopectin content. Arum, tulip and iris starches are white. Fritillary starch is faintly yellow, and crocus starch has a slight pink tinge.

Digest from "Properties of Starches From Wild Plants," by S. M. Strepkov and Ch. K. *Kuramschin, Journal für proktische Chemie* 150, 186, 1938. (Published in Germany.)

What Makes the Price of Dry Beans?

INCOME OF INDUSTRIAL WORKERS between 1922 and 1936 was the dominant factor affecting the price of dry beans. More than 50 per cent of the explained price variations is attributable to this factor. A smaller part of the price variations of most classes of beans could be accounted for by changes in production or supply.

Apparently the amount of production of lima beans exerted a considerable influence on the prices of other varieties. Influence of the prices of competing foods such as meat, potatoes or rice cannot be reliably measured although "some may at times exert a certain degree of pressure on the price of beans."

(Apparently people eat beans solely because they like them. This report ought to be very valuable to purchasing agents—if they are statistically minded and like tough reading.—Ed.)

Digest from "A Study of Factors Affecting the Price of Dry Edible Beans in the United States, By Classes, 1922–23 to 1934–35," by Janet Murray, Bureau of Agricultural Economics, U. S. Dept. of Agriculture.

More on the Toxicity of Lead

THE LABORATORY of the Fish Canneries Institute in Portugal has investigated the possible lead poisoning hazard of canned sardines containing from 0 to 3 or 4 milligrams of lead per kilogram. This dosage being smaller than would be expected to cause saturnism, i.e., lead poisoning, the animal feeding tests were continued for a year with rabbits, guinea pigs, rats, cats and chickens (240 animals in all). The results gave no evidence of toxicity since the general health, growth, reproductive activity and mortality rates of test animals compared favorably with controls receiving no lead. Autopsies of animals which died or were killed during the test revealed no significant differences.

In spite of the negative result of the tests, it cannot be stated dogmatically that the quantity of lead in canned sardines is absolutely harmless. Such a conclusion would be valid only if supported by a much longer test than that which is now reported. Neither can it be said that lead is a "physiological element", i.e., one which must be present in traces for proper functioning of the body. Even though traces of lead are found in the organs of healthy men and animals, its presence must be considered accidental.

No evidence has ever been found that lead serves any functional purpose in the body, but when it is once ingested its elimination is extremely slow. Undoubtedly, the dangers of lead poisoning from canned foods have been exaggerated, but the canning industry dares not relent in the campaign of prevention. It is believed that a tolerance of 3 parts per million would be entirely safe for the public health.

Digest from "Lead in Canned Sardines," by Melles E. Rodrigues, Lucilia Brito and F. Lemos, *Chimie et Industrie* 39, Special No., Part II, 811C, 1938 (Published in France).

Foods And Chemical Warfare

AMONG ALL THE PROBLEMS of preserving and conserving food supplies when exposed to war gases, among the most urgent is the possibility of safe recovery after contamination. Chlorine and phosgene are not particularly serious hazards for liquids, which can be purified by air blowing, boiling or treatment with active carbon. The same is true of many solid foods if they can be washed with soda solution. But cheese is easily ruined by chlorine or phosgene. Chloropicrin is not at all easy to remove from contaminated foods excepting bread, which needs only to be toasted. Eggs have, in effect, about the same degree of protection from war gases as do canned or packaged goods. The arsenical gases, such as lewisite, are dangerous even after they have lost their sternutating (sneeze producing) or vesicant (blistering) properties because they contain arsenic.

In packaged goods, the efficacy of protection depends on the closure or wrapping, with perfect protection obtained in well-sealed glass jars and in cans; and excellent protection in wide-mouth glass or earthenware containers, if well sealed. Waxed paper and cellulosic foils give good protection against gases and liquids, but plain paper and thin cartons have only slight protective effect.

Liquid foods, and solids with high moisture content, are particularly difficult to protect, not so much in the home, where containers can be provided, as in stores and restaurants where quantity may often exceed the capacity of protection facilities. If contamination is light and the product is not sensitive to heat, prolonged boiling with water will make it safe after exposure to mustard gas and some other gases.

Digest from "Foods and Chemical Warfare Agents," by A. P. J. Hoogeveen, *Chem. Weekblad* 35, 288, 1938. (Published in Holland.)

Minerals in Foods

TO SAY that any standard food substance is "rich in minerals" has no meaning, unless that particular sample has been analyzed for its mineral content. Reason: some samples of spinach have ten times as much iron as others; some potatoes have several times as much calcium as others; sometimes wheat is rich in phosphorus, sometimes very poor.

Diets recommending the free use of specific foods to overcome mineral deficiencies may be of little value unless the mineral content is known.

Digest from "Variations in Mineral Food Analyses," by Glen Wakeham and A. H. Word. Presented at Dallas meeting of American Chemical Society.

Salt From Seawater by Freezing and Evaporation

A PILOT PLANT for production of salt from seawater has been erected on the Gullmar Fjord at Alsbäck, Sweden, by a manufacturer of power machinery, namely Svenska Turbinfabriks Aktiebolaget. The new plant will try out, on a semi-factory scale, a new freezing process for concentrating salt in seawater. The Gullmar Fjord was selected because the sodium chloride content of the water in the fjord is unusually high. The inventor of the process has combined the advantages of freezing, which will not concentrate salt sufficiently to cause crystallization, with evaporation which effects final separation of the salt from the water.

The raw seawater is frozen until a concentrated brine is obtained. Crystallization by evaporation can then be effected in a much smaller space, and in shorter time, than from the raw seawater. Trials have indicated that 90 per cent of the sodium chloride can be recovered from seawater by this method. Production costs cannot be stated exactly until some experience with the pilot plant is available, but the process is expected to be profitable. Ample land space for expansion has been reserved and will be utilized if and when the pilot plant proves the project to be commercially sound.

Digest from "Salt From Seawater," *Chemisch Weekblad* 35, Rubriek voor Handel en Industrie, p. 90, April 9, 1938. (Published in Holland.)

Efficiency in Packaging

(*Continued from page 437*)

single, automatic, collapsible tube filling and closing machine and subsequently cartoned with a reasonable degree of efficiency.

These are but typical examples, and it is admitted that on occasion a certain amount of efficiency was sacrificed for the necessary or desirable flexibility in setting up a given production line.

In planning packaging operations of this type, the machine time must of necessity be carefully allocated to each lot of each product, since each lot varies in size from cycle to cycle. So an endless tape or band, moving much like the contest chart or drive "thermometer," but in a horizontal plane and with days instead of per cents or degrees drawn on the chart, will prove helpful. As each job is assigned to any given packaging line, the band is moved ahead the calculated number of days on the chart.

Incidentally, the past experience figure for the given product on the given packaging line, and not the potential capacity, is used for moving the tape ahead. In this manner, the amount in days of work ahead of each line is always known. It affords the necessary data in visual form to allocate each product to that line carrying the lightest schedule when there is a choice, *i.e.*, when more than one line will handle the product.

When the tape gets too far ahead and only one line is available for the product, two packaging shifts are put on. When it is but little ahead of the calendar, either the hours per day or the days per week are curtailed until such time as all is in balance again. The control this affords and the good psychological effect upon the workers when they know well ahead the hours and days they will be called upon to work need not be elaborated.

The remarks relative to planning and allocating the work to the assembly lines apply with equal force to the manufacturing department, but that is another story.

There is usually one best way to make the necessary changes when more than one size of the same product, or two or more dissimilar products, must be produced on the same packaging line. This almost invariably holds whether the line be automatic or only semi-automatic and whether handling liquids, creams or powders, both free and non-free flowing.

For example, if the line is for filling liquids, a definite procedure for changing the bottle washer or cleaner, the filler, the capper, the labeler, the cartoner, if any, and case sealer can be set up. The parts it is necessary to replace on each piece of equipment should be held in the parts-storage or maintenance department and brought to the job in a suitable receptacle.

This may be a wood or metal box of proper size and convenient shape, with the various parts suitably arranged in trays and on hooks on the sides. A typewritten table of the best order for disassembling and reassembling may be prepared from previously accumulated experience. Instructions for making the change as well as all necessary adjustments may well be incorporated.

It is also well to provide right in the box the necessary tools to effect the change, particularly if certain special wrenches or other gadgets are required. These will save needless trips to the maintenance shop or parts-storage room for forgotten items. Then, too, if each has a definite place in the receptacle, the likelihood of any being left laying on the equipment is reduced. Mechanics have been known to leave tools laying on the machine, with the unhappy result that one vibrated off and fell into the moving parts after the machine was started, causing not only serious damage to the equipment but costly avoidable delay and loss of machine time.

THE LOADED TOTE BOX may be carried to the production line along with an empty one for the parts which are to be removed. Or if quite heavy, a buggy with large-diameter casters may be provided; the casters may be of rubber if this is warranted. Such a buggy may be of a convenient working height, minimizing or eliminating stooping and obviating the necessity of using the floor for a table.

Production men are prone to think of line changes from one product to another, or from one size to a second, in terms only of lost machine time and of the mechanic's labor consumed in effecting the change. By proper planning in the production or planning department, the production-line changes can usually be made out of regular working hours, so that there is no lost machine and line-labor time.

By adhering to a definite procedure and providing the parts and tools at the mechanic's elbow, the labor cost can be materially reduced. Of far greater importance, however, is the factor sometimes not given due weight and on occasion overlooked altogether. This is the matter of final adjustments that can be made only with the line in regular production.

AFTER the line is fully changed, it requires many minor adjustments, such as that of fill height or net weight on the filler or packer, glue film on the labeler or carton sealer and so forth. These result both in considerable loss of production and in damaged packages before everything is running along smoothly at capacity. The containers may be wholly spoiled or at least be in a condition requiring them to be emptied and reworked.

When a line change is made, all the niceties of adjustment which made for efficiency on the previously run package or product are cast to the four winds. Then they all have to be tediously arrived at all over again with every change-over of the packaging line. Here, then, is a real leak, a real expense, that only too frequently is winked at or, if recognized, arouses insufficient concern to inspire definite corrective steps.

One manufacturer of cartoning machines that will handle everything—from chewing gum through sardellen or anchovy paste in tubes to pies of the 5-cent to regular sizes—has done something about this. He effects size and product changes by substituting complete subassembly units that have a positive location and no provision whatsoever for adjustments. The first cost of change parts is obviously higher, but this arrangement eliminates the fine and repeated adjustments necessary to get the new size or product running smoothly and efficiently after a change-over.

Would that other manufacturers of packaged specialty equipment grasped the idea and did the same. Certainly this procedure in design would lift a burden, a worry, from the shoulders of the production men and more particularly the maintenance foreman.

But until the millennium arrives, we must go on as we have for many years. We must use fixtures, mandrels, templates and every other conceivable gadget—even scratch marks on the machines themselves—as aids to correct setting of the various machine parts for different package sizes and products. These do help to reduce change-over time and, of greater importance, reduce lost machine time and the attendant period of reduced efficiency.

BOOKS RECEIVED

TRANE AIR CONDITIONING MANUAL. Published by Trane Co., La Crosse, Wis., 1938. 322 pages; 8¾x11¼ in.; cloth, well illustrated. Price $5 (price includes pad of 25 psychrometric charts and six cooling-load estimate charts).

Nothing on the subject of air conditioning which is so comprehensive and practical and yet so simply and understandably presented has come to the attention of this reviewer. In writing this book, Trane Co. set out to present factual material in such a way as to simplify the apparently complex principles of air conditioning. And the company has succeeded in its aim.

The manual includes chapters on heat, comfort, heat gains, properties of air and the psychrometric chart, calculations for the conditioned air supply, refrigeration for air conditioning, water for air conditioning and reference tables. There are 71 of the latter.

Problems involving air-conditioning calculations are included in the various chapters, and in the back of the manual are the correct answers to the problems. So it is possible for the reader to check his understanding of the theory discussed in each of the chapters.

Many tables and a great many charts are included in the manual, these showing the effect and value of the various factors entering into the conditioning of air and simplifying the calculations involved in working out air-conditioning problems.

No attempt is made in the book to derive the various formulas and methods by strictly mathematical means, a fact which makes the book more valuable to the practical man.

CHEMICAL ANALYSIS OF FOOD PRODUCTS. By Morris B. Jacobs, Chemist, Bureau of Foods and Drugs, Department of Health, City of New York, Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York. 1938. 517 pages; 6¼x9¼ in.; cloth. Price $6.

An exhaustive treatment of the subject of food analysis is given in this work. In addition to systematic coverage of the salient facts of the chemical analysis of food products, the author has included certain of the newer aspects of food analysis, such as the chemical assay of vitamins, the detection of improper pasteurization of milk, the homogenization of milk, the detection of gums and methods for the detection of newer types of sophistication of foods, such as adulteration of olive oil with tea seed oil. Designed for use as a manual in control work in the food factory, as well as for use as an educational text, the book presents short practical methods.

The sixteen chapters cover general methods, physical chemical methods, coloring matter, preservatives, metals, milk and cream, milk products, oils and fats, sugar foods and carbohydrates, gums, cereals, starch and other polysaccharides, jams, jellies and fruits, spices, flavors and condiments, non-alcoholic beverages, alcoholic beverages, meat, meat products, fish and eggs, vitamins and inorganic determinations.

INTRODUCTION TO BACTERIOLOGICAL CHEMISTRY. By C. G. Anderson. Published by William Wood & Co., Mount Royal & Guilford Aves., Baltimore, Md., 1938. 266 pages; 5x7½ in.; cloth. Price $4.

The whole field of bacteriological chemistry is touched upon in this book, which is the outcome of lectures presented in courses at the University of London and the University of Edinburgh. The book is designed primarily for students, but is also of value to research workers who need some understanding of the metabolic behavior and chemical nature of the organisms which they are handling. The book consists of three parts: General Considerations, Metabolism and Some Aspects of Immunochemistry.

ANNUAL REVIEW OF BIOCHEMISTRY, Vol. VII. James Murray Luck, editor, Carl R. Noller, associate editor. Published by Annual Reviews, Inc., Stanford University P. O., Calif., 1938. 528 pages; 6½x9 in.; cloth. Price $5.

In this volume of the review appear treatises on several subjects of interest to food technologists. Among these are papers on biological oxidations and reductions, chemistry of the crystalline enzymes, chemistry of the carbohydrates and the glycosides, the chemistry of the acyclic constituents of natural fats and oils, the chemistry of amino acids and proteins, carbohydrate metabolism, fat metabolism, the vitamin B group, vitamin C, the fat-soluble vitamins, nutrition and the chemistry of bacteria.

THE SOYBEAN INDUSTRY. By A. A. Horvath, Chemist, Agricultural Experiment Station, Newark, Del. Published by Chemical Publishing Co. of New York, Inc., 148 Lafayette St., New York, 1938. 197 pages; 5¾x8¾ in.; cloth. Price $4.

A lifetime in the soybean industry has qualified the author of this monograph to speak with outstanding authority on the subject of soybean processing. And Dr. Horvath presents his knowledge in a concise and practical manner. He covers soybean flour, soybean oil, lecithins, soybean proteins, plastics, adhesives and meal. At the close of the book is a bibliography. There are twenty chapters in the 197 pages, which shows that the treatment of each subject is brief and to the point.

SOILLESS GROWTH OF PLANTS. By Carleton Ellis and Miller W. Swaney. Published by Reinhold Publishing Corp., 330 West 42d Street, New York, 1938. 150 pages; 6¼x9¼ in.; cloth. Price $2.75.

Here is a book for which amateurs in the science of hydroponics have been waiting. Starting with a chapter that explains the chemistry of plant life, the authors attempt to give the reader some fundamental knowledge upon which to base an understanding of the remainder of the work. Then they tell how to grow plants in mineral aggregates and in water. Next are facts on household plant culture, a chapter on the commercial aspects of this type of agriculture, one on special chemicals, and chapters on common detriments and nutrient formulas.

Food processors and distributors might do well to study the possibilities of this new method of producing raw materials. Soilless agriculture may or may not result in important changes in the supply of foodstuffs, but it certainly has possibilities that bear watching. It takes little stretch of the imagination, for instance, to see how the production of fruits and vegetables in factory buildings within large cities might seriously affect not only the fresh produce business but also the sale of canned and frozen foods.

PATENTS

Fruits Pre-Cooled Before Extraction of Juice Subsequently Converted Into Solid Form Through Alternate Subjection to Partial Vacuum, Atmospheric Pressure, Partial Vacuum or Formation of Slush Which is Then Solidified by Freezing—Valentine Ruch, Englewood, N. J. No. 2,117,215. May 10, 1938.

Soy Beans Roasted For Removal of Objectionable Volatiles After Drying to 10-15 Per Cent Moisture and Coating With a Thin Layer of a Protective Oil to Prevent Oxidation and Overheating—Fritz Gössel, Frankfort-on-the-Main, Germany, to General Soya Corp., New York, N.Y. No. 2,117,315. May 17, 1938.

Chocolate-Sugar Powder Mixture in Which Dextrose and Sucrose Are Present in a 3:1 Ratio to Each Other—Herbert T. Middleton, Englewood, N.J. to International Patents Development, Wilmington, Del. No. 2,117,344. May 17, 1938.

Meats and Hemoglobin-Containing Materials Cured by a Salt-Acid Mixture in Which the Nitrite Value Is Protected Against Loss by Particle Coatings of Sodium Chloride to Keep Acid Constituents and Nitrite Particles Separated Until Used—Lloyd A. Hall, to Griffith Laboratories, Inc., Chicago, Ill. No. 2,117,478. May 17, 1938.

Wine Freed From Volatile Acid Content in a Continuous Manner by Application of Heat, Neutralization of Acid Portion of Vapor and Condensation of Non-Acid Vapor—Julius H. Fessler, Berkeley, and Harry C. Johnson, Davis, Calif. to Mt. Diablo Wine Association, Emeryville, Calif. No. 2,117,604. May 17, 1938.

Proteins of Acid-Curded Skimmed Milk Made Soluble by Acidification to 4.4pH and Heating to About 195 Deg. F. for 90 Min., Neutralizing to About 9.5pH and Cooling to About 60 Deg. F.—Anthony R. Sanna and Filip Leon Sanna, Madison, Wis. No. 2,117,681. May 17, 1938.

Chocolate-Flavored Milk Powder Mixture Made From Skimmed Milk Treated to Coagulate Proteins with the Addition of Low Fat Cocoa, Alkalization to Bring Mass to About 8.5pH, and Emulsification Through Homogenizer—Filip Leon Sanna, Madison, Wis. No. 2,117,682. May 17, 1938.

Soya Oil Purified Through Removal of Phospholipids Followed by High Vacuum-Short Path Distillation—Arthur O. Tischer, to Eastman Kodak Co., Rochester, N.Y. No. 2,117,776. May 17, 1938.

Egg Yolk and White Separated in a Cup Designed to Permit Simultaneous Emptying of Yolks and Whites Into Separate Containers—Samuel Meckler, St. Paul, Minn. No. 2,117,899. May 17, 1938.

Ground Coffee Particles Mixed Mechanically for Uniform Blending of Chaff and Finely Ground Particles Throughout the Mass of the Coarser Particles—Albert J. Hazle, Jr., to B. F. Gump Co., Chicago, Ill. No. 2,118,010. May 17, 1938.

Cocoa-Containing Material Freed From Theobromine Content Through Treatment With Water and Alkaline Earth Oxide at a Temperature of 140 to 212 Deg. F. and Separation of the Solid From the Resulting Liquid—Benjamin J. Zenlea, Ozone Park, N.Y. to Rockwood & Co., Brooklyn, N.Y. No. 2,118,129. May 24, 1938.

Liquid Coffee Concentrate Adjusted to 5.7pH by Addition of Disodium Phosphate—Douglas Fronmuller, Middle Village, and Frank M. Boyles, Brooklyn, N.Y. to Coffee Products Corp., New York, N. Y. No. 2,118,184. May 24, 1938.

Whey in a Wet Semi-Solid State Dried in a Continuous Manner to Form a Hygroscopic Product—George Howard Kraft, to Kraft Phenix Cheese Corp., Chicago, Ill. No. 2,118,252. May 24, 1938.

Barley Polished or Pearled During Passage Through Mechanical Unit Comprised of a Cylindrical Screen Within Which Rotates Shaft Fitted with Brushes—John E. Johnson, Atwater, Minn. No. 2,118,309. May 24, 1938.

Fruit Drying Carried Out Under Controlled Pressure and Temperature Conditions Through Measuring the Electrical Resistance of the Fruit to Determine When the Fruit Sugars Have Reached an Anhydrous Crystalline State—Earl N. Percy, to Dry Fruit Products Co., Oakland, Calif. No. 2,118,324. May 24, 1938.

Beans Dried During Downward Passage Through Tower Having a Plurality of Air Passageways From Which Beans Are Discharged in a Regulated Flow Manner by a Rotating Roller Type Valve Device—Clare E. Wilson, Sparta, Mich. No. 2,118,334. May 24, 1938.

Banana Mixture Prepared by Boiling Unripe Bananas with Skins or, Removing Skins, Mixing the Unripe Banana Mass with Ripe Bananas in Raw State, Adding a Flour to Form a Pastry Mass, Drying in Thin Sheets and Breaking-Up Into Flake Form—Maximiliano Caballero Allain and Charles Walter Tracy, Brooklyn, N.Y. No. 2,118,391. May 24, 1938.

Banana Concentrate Prepared by Extracting Pulp From Ripe Bananas With Alcohol, Separating Liquid Portions of Undissolved Banana Pulp, and Drying Separately the Alcoholic Extract Portion and the Undissolved Pulp—Stephen A. Karas, Forest Hills, N.Y. No. 2,118,405. May 24, 1938.

Dough Mixing Put on a Controlled Time Basis by Driving Mixer Beater Arms From Motor Connected With a Timer Circuit for Differential Speed Performance Over Predetermined Intervals of Time—Lester Ferenci, to American Machine & Foundry Co., Brooklyn, N.Y. No. 2,118,500. May 24, 1938.

Pastry Rolling Pin Cleaned Through the Use of a Slack Pliable Wire Scraping Device—Henry Hansen, Burlingame, Calif. to Swift & Co., Chicago, Ill. No. 2,118,923. May 31, 1938.

Bread Doughs Divided and Formed Into Rounded-Up Lumps by a Combination Divider and Rounder—Fred Marasso, to Union Machinery Co., Joliet, Ill. No. 2,119,017. May 31, 1938.

Fresh Fruits Brightened in Color and Made Resistant to Decay Through Treatment with a Diazotized Intermediate and Immersion in a Bath Containing Beta Napthol—Jagan N. Sharma, Riverside, Calif. to Food Machinery Corp., San Jose, Calif. No. 2,119,060. May 31, 1938.

Fish Oils Given Higher Melting Point Through Partial Hydrogenation Followed by Treatment With an Isomerizing Agent—Anderson W. Ralston and Stewart T. Bauer, to Armour & Co., Chicago, Ill. No. 2,119,141. May 31, 1938.

Potatoes and Other Starch-Containing Vegetables Put Into Dry Powder Form Without Changing Initial Form of Starch—Arnold Faitelowitz, Suresnes, France, 75 Per Cent to Marcos Bunimovitch, Brussels, Belgium. No. 2,119,155. May 31, 1938.

Yeast Grown in Nutrient Medium Containing Molasses and Aerated in Such a Manner That the Dispersed Air Particles Have a Diameter Size of From a Few Microns to About One-Fourth Millimeter — Bernardus Lebuinus Maria van der Lande and Emile van Thiel, Compiegne, France to Naamlooze Vennootschap Industrieele Maatschappij Voorheen Noury & Van Der Lande, Deventer, Netherlands. No. 2,119,188. May 31, 1938.

Coffee in Green State Sprayed with Small Amount of Water Containing a Suitable Oxidizing Agent Prior to Delivery Into Roaster—Herman Heuser, Evanston, Ill. No. 2,119,329. May 31, 1938.

Milk in Cans Given a Heating and Cooling Treatment During Passage Through a Rotating and Reciprocating Drum—Walter Page, Scarsdale and Burt E. Taylor, Mount Vernon, N.Y. to Borden Co., New York, N.Y. No. 2,119,346. May 31, 1938.

Milk Heated and Cooled Under Vacuum in Rotating Chamber Fitted With a Series of Fixed Vanes to Assure Agitation—Walter Page, Scarsdale, and Burt E. Taylor, Mount Vernon, N.Y. to Borden Co., New York, N.Y. No. 2,119,347. May 31, 1938.

Cream Treated With Carbon Dioxide in Presence of Finely Divided Platinum Before Churning Into Butter—Harold Eugene Kistner, Sabetha, Kan. No. 2,119,461. May 31, 1938.

Cultured Milk Made Through Use of Lactobacillus Acidophilus and Streptococcus Thermophilus—Frederic W. Nordsiek, to The Sanodern Co., Inc., New York, N.Y. No. 2,119,599. June 7, 1938.

Sweet Potatoes Leeched With Water in the Presence of a Preservative Followed by Adjustment to Approximately pH 7 and Stored for Industrial Use in the Presence of Sodium-2-4-5-Trichlorphenate—Francis H. Thurber, Arlington, Va., to the free use of the People of the United States. No. 2,119,612. June 7, 1938.

Milk Serum Condensed Under Vacuum With the Addition of Sucrose to Form a Finished Product Containing 32 Per Cent Water and at Least 68 Per Cent Total Solids—Byron H. Webb, Washington, D.C. and Guy A. Ramsdell, Arlington, Va., to the free use of the People of the United States. No. 2,119,614. June 7, 1938.

Milk Pasteurized by Short-Time Method by Heating From 100 to 158 Deg. F. in 4 Min., Cooling to 145 Deg. F. in About 1 Min., Then Heating to Approximately 160 Deg. F. in Not More Than 2 Min., and Holding For Approximately 15 Sec. Before Cooling—Rolan Jay Wightman, Little Falls, N.Y. to Cherry-Burrell Corp., Wilmington, Del. No. 2,119,616. June 7, 1938.

Egg Meats Freed From Contamination by Filtering With a Gelatine Solution and Then Sterilizing With a Chlorine Solution With Removal of Separated Matter From Liquid Egg Meats—Samuel Tranin, Kansas City, Mo. No. 2,119,657. June 7, 1938.

Skinned Bacon Slabs Shaped in Forms Under Pressure at Setting Temperature for Bacon Fat—Harry H. McKee to Industrial Patents Corp., Chicago, Ill. No. 2,119,716. June 7, 1938.

Animal Casings Prepared for Printing by Coating With Film of Cellulose Viscose on Outer Surface—Charles T. Walter to Industrial Patents Corp., Chicago, Ill. No. 2,119,729. June 7, 1938.

Milk Casein Precipitated from Sterile Heated Milk Solution by Use of B. Acidophilus—Stewart M. Farr, Genesee Depot, Wis. No. 2,119,739. June 7, 1938.

Pretzels Salted by Mechanical Means—Joseph D. Ferry, Harrisburg, Pa. Nos. 2,119,909 and 2,119,910. June 7, 1938.

Citrus Fruits Sprayed With a Dye Solution as a Skin Treatment—Richard Holzcker, Lake Wales, Fla. to Citrus Color & Supply Co., Tampa, Fla. No. 2,119,914 June 7, 1938.

Citrus Fruits Given a Heightened Color of Skin or Peel Through Coating Action of a Color-Solvent-Wax Solution — Richard Holzcker, Lake Wales, Fla. one-third to C. C. Commander, Tampa, Fla., and one-third to I. A. Yarnell, Lake Wales, Fla. No. 2,119,915. June 7, 1938.

Liquid Mash Concentrate Containing 70 to 80 Per Cent Total Solids and A Strength of 350 to 480 Deg. Lintner Added to Gelatinized Pasteurized Starch Material to Saccharify for Use in Distilling and Brewing—Gerald C. Baker, to Premier-Pabst Corp., Peoria Heights, Ill. No. 2,119,981. June 7, 1938.

Bakery Products Storage Cabinet Made By Forming a Mixture Containing 55 Parts by Weight of Diatomaceous Earth, 140 Parts of Ammonium Sulphate, 210 Parts of Water, 0.6 Parts of Gum Tragacanth, and 20 Parts of Plaster of Paris—Marion D. Coulter, Pittsburgh, Pa., to Toledo Scale Mfg. Co., Toledo, Ohio. Nos. 2,120,020 and 2,120,021. June 7, 1938.

Ripe Fruit Juices Blended and Held in a Non-Free Oxygen Containing State—Floyd W. Robison to Pure Fruit Juices, Inc., Detroit, Mich. No. 2,120,261. June 14, 1938.